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CITY OF BOSTON

The Commonwealth of Massachusetts

ANNUAL REPORT

OF THE

METROPOLITAN DISTRICT COMMISSION

FOR THE YEAR 1927





Aug. 21, 1928.

CONTENTS

	PAGE
I. Organization and Administration	1
Commission, Officers and Employees	1
II. General Financial Statement	1
III. Construction	1
IV. Parks and Reservations	2
V. Rainfall and Consumption of Water	3
VI. Special Investigations	3
VII. Other Reports	4
Report of the Director and Chief Engineer of Park Engineering	4
Data relating to Metropolitan Park System	7
Report of the Director and Chief Engineer of Water Division	11
Organization	11
Metropolitan Water District and Works	11
Construction	11
Improvement of Service in Watertown	11
Southern High Service Pipe Lines	12
Meters and Connections	12
Chlorinating Apparatus	12
Improvement of Wachusett Watershed	12
Proposed Extensions of the Works	12
Maintenance	12
Precipitation and Yield of Watersheds	12
Storage Reservoirs	13
Wachusett Reservoir	13
Sudbury Reservoir	14
Framingham Reservoir No. 3	15
Framingham Reservoirs Nos. 1 and 2, Ashland, Hopkinton and Whitehall Reservoirs and Farm Pond	15
Lake Cochituate	15
Aqueducts	16
Protection of Water Supply	17
Clinton Sewage Disposal	18
Forestry	18
Hydroelectric Service	19
Distribution Pumping Stations	20
Distribution Reservoirs	22
Consumption of Water	23
Water from Metropolitan Water Works Sources used outside of the Metropolitan Water District	25
Report of Director and Chief Engineer of Sewerage Division	26
Organization	26
Metropolitan Sewerage Districts	26
Areas and Populations	26
Metropolitan Sewers	27
Sewers purchased and constructed and their Connections	27
Construction	31
North Metropolitan Sewerage System	31
Mill Brook Valley Sewer — Arlington	31
Belmont Relief Sewer — Section 81	31
Malden, Revere and Everett Drainage System	31
New Mystic Valley Sewer	31
Maintenance	31
Scope of Work and Force employed	31
East Boston Pumping Station	32
Deer Island Pumping Station	32
Charlestown Pumping Station	32
Alewife Brook Pumping Station	32

	PAGE
Nut Island Screen-house	33
Gasolene in Public Sewers	33
Data relating to Areas and Populations contributing Sewage to —	
Metropolitan Sewerage System	34
North Metropolitan System	34
South Metropolitan System	35
Whole Metropolitan System	36
Pumping Stations	37
Capacities and Results	37
North Metropolitan System	37
South Metropolitan System	38
Metropolitan Sewerage Outfalls	39
Material intercepted at the Screens	39
Financial Statement	40
Parks Division	40
Sewerage Division	56
Water Division	60
Appendix No. 1. — Contracts relating to the Metropolitan Parks Division made and pending during the year 1927	68
Appendix No. 2. — Contracts relating to the Metropolitan Water Works made and pending during the year 1927	70
Appendix No. 3. — Tables relating to the Maintenance of the Metropolitan Water Works	75
Table No. 1. — Monthly Rainfall in Inches at Various Places on the Metropolitan Water Works in 1927	75
Table No. 2. — Rainfall in Inches at Chestnut Hill Reservoir, 1927	76
Table No. 3. — Wachusett System — Statistics of Flow of Water, Storage and Rainfall in 1927	78
Table No. 4. — Sudbury System — Statistics of Flow of Water, Storage and Rainfall in 1927	79
Table No. 5. — Cochituate System — Statistics of Flow of Water, Storage and Rainfall in 1927	80
Table No. 6. — Sources from which and Periods during which Water has been drawn for the Supply of the Metropolitan Water District	81
Table No. 7. — Average Daily Quantity of Water flowing through Aqueducts in 1927 by Months	82
Table No. 8. — (Meter Basis) Average Daily Consumption of Water by Districts in the Cities and Towns supplied by the Metropolitan Water Works in 1927	83
Table No. 9. — (Meter Basis) Average Daily Consumption of Water in Cities and Towns supplied by the Metropolitan Water Works in 1927	84
Table No. 10. — Chemical Examinations of Water from the Wachusett Reservoir, Clinton	87
Table No. 11. — Chemical Examinations of Water from the Sudbury Reservoir	88
Table No. 12. — Chemical Examinations of Water from Spot Pond, Stoneham	88
Table No. 13. — Chemical Examinations of Water from Lake Chochit- uate	89
Table No. 14. — Chemical Examinations of Water from a Tap at the State House, Boston	89
Table No. 15. — Chemical Examinations of Water from a Faucet in Boston, 1898-1927	90
Table No. 16. — Number of Bacteria per Cubic Centimeter in Water from Various Parts of the Metropolitan Water Works, 1898-1927	90

	PAGE
Table No. 17. — Colors of Water from Various Parts of the Metropolitan Water Works in 1927	91
Table No. 18. — Temperatures of Water from Various Parts of the Metropolitan Water Works in 1927	92
Table No. 19. — Length of Metropolitan Water Works Main Lines and Connections and Number of Valves set in Same, Dec. 31, 1927	93
Table No. 20. — Length of Metropolitan Water Works Hydrant, Blow-off and Drain Pipes, Dec. 31, 1927	94
Table No. 21. — Length of Metropolitan Water Works Main Lines and Connections and Water Pipes, Four Inches in Diameter and Larger, in the Several Cities and Towns in the Metropolitan Water District, Dec. 31, 1927	95
Table No. 22. — Number of Service Pipes, Meters, Per Cent of Services Metered, Fire Services and Fire Hydrants in the Several Cities and Towns in the Metropolitan Water District, December 31, 1927	96
Table No. 23. — Elevation of the Hydraulic Grade Line, in Feet, above Boston City Base for Each Month at Stations on Metropolitan Water Works during 1927	97
Appendix No. 4. — Contracts made and pending during the year 1926 — Sewerage Division	100

REPORT OF THE METROPOLITAN DISTRICT COMMISSION

To the Honorable the Senate and House of Representatives of the Commonwealth of Massachusetts in General Court assembled.

The Metropolitan District Commissioner has already presented to your Honorable Body an abstract of the account of the receipts, expenditures, disbursements and liabilities of the Metropolitan District Commission for the fiscal year ending on November 30, 1927, and now, in accordance with the provisions of section 100 of chapter 92 of the General Laws, presents a detailed statement of its doings for the calendar year ending on December 31, 1927.

EIGHTH ANNUAL REPORT

I. ORGANIZATION AND ADMINISTRATION

COMMISSION, OFFICERS AND EMPLOYEES

The term of office of Frank G. Hall expired on November 30, 1927, but as yet no appointment has been made. The membership of the Commission has consequently remained as in the preceding year: Davis B. Keniston, Commissioner; Frank A. Bayrd, Frank G. Hall, William H. Squire and George B. Wason, Associate Commissioners. John R. Rablin is Director of Park Engineering, William E. Foss, Director of the Water Division and Frederick D. Smith, Director of the Sewerage Division.

George Lyman Rogers has continued as secretary, William E. Whittaker was during the year appointed assistant secretary, and the following have continued as chief engineers: of parks, John R. Rablin; of water, William E. Foss; of sewerage, Frederick D. Smith.

The maximum number of employees during the year was 1,601, divided as follows: general offices, 29; parks, 959; water, 397; sewerage, 216.

In this tabulation of employees the police are included under parks, although they give considerable protection to portions of the water system.

II. GENERAL FINANCIAL STATEMENT

Year ending November 30, 1927

Expended for construction	\$1,963,535 68
Expenditures, miscellaneous	207,143 96
Expenditures for maintenance	3,727,714 97
Total expenditure	5,898,394 61
Unexpended balance, maintenance appropriations	1,183,483 54
Serial bonds and notes issued	2,602,163 08
Serial bonds and notes paid	1,619,731 46
Increase in sinking funds	2,316,772 38
Decrease in net debt	1,334,340 76

On November 30, 1927

Net debt	\$38,702,750 23
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III. CONSTRUCTION

The fourth and last section of the Mill Brook Valley sewer in Arlington was completed early in the year and the entire sewer is now in operation.

The work on Belmont relief sewer extension from the Belmont town line to the Alewife Brook Valley sewer was commenced March 11 and was completed November 15 and the line put in operation.

No work upon the Malden, Revere and Everett drainage channel has been carried on during the year as the temporary injunction issued by the Supreme Court has not been dissolved.

Plans for the new Mystic Valley main sewer authorized by Chapter 184 of the Acts of 1927 have been completed and contract plans are about completed.

Two new horizontal boilers have been installed at the Deer Island pumping station and the coal run from the wharf to the shore has been rebuilt. Two boilers and the economizer at the Charlestown pumping station have been replaced. A new pumping unit and feed water heater at the Alewife Brook pumping station have been installed and one boiler has been retubed.

Work on the Watertown Branch of the Weston Aqueduct supply mains has been completed. Construction of the southern high-service pipe line from Chestnut Hill pumping station to the Arborway at Jamaica Pond was started in May, and the line has been completed except for a section 300 feet in length, and for considerable refilling and resurfacing.

Chlorinating apparatus at Chestnut Hill Reservoir for the Lake Cochituate supply has been installed. A contract has been awarded for a new three-million gallon pumping engine for the Arlington station. Surveys have been completed for the proposed northern high-service pipe line from Main Street, Malden to Broadway, Revere, and considerable work has been done upon the surveys for the proposed Weston Aqueduct supply main from Weston through Newton and Brighton to connect with the 48-inch low-service lines from Chestnut Hill pumping station to Spot Pond.

The John W. Weeks foot bridge was completed early in the year and was formally dedicated in May. The construction of the Cottage Farm bridge has been in progress and the Cambridge arch and main span and the piers and steel work for the railroad bridge have been completed, but the date of completion of the bridge has been substantially delayed by the change in plans for the steel work for the railroad bridge, to comply with the requirements of the Boston & Albany Railroad.

Pope's Hill bridge for the New York, New Haven & Hartford Railroad over the Old Colony Parkway, with this link of the parkway, has been completed and opened to travel.

Work upon the Dorchester Bay bridge was started in July and will be completed during the year.

The remaining section of the Northern Traffic Artery along Bridge Street from Lechmere Square to Commercial Street and the new roadway between Lechmere Canal and Broad Canal have been completed.

The surfacing, grading and planting along Soldier's Field road between Western Avenue and North Harvard Street has been finished.

The proposed Charles River Road on the Boston side of the Charles River from Chilmark Street to the new Cottage Farm bridge has been graded.

Memorial Drive from Western Avenue to Boylston Street has been resurfaced.

Wales Street bridge between Newton and Wellesley, authorized by Chapter 283 of the Acts of 1927, was started and has been completed except the surfacing of the roadway on the approaches and bridge.

About 3.2 miles of roadway in Stony Brook Reservation have been reconstructed and resurfaced.

Blue Hill river road in the Blue Hills Reservation from Hillside Street, Milton, to West Street, Braintree, has been subgraded for a substantial distance.

One hundred and fifty electric lamps with underground cable have been installed in Middlesex Fells Reservation and Charles River Reservation and 175 higher power lamps have replaced the smaller lamps on Memorial Drive. A skating pond in Blue Hills Reservation at West Quincy has been built; a new water main at Revere Beach installed; parking spaces at Nahant provided; and Malden Border Road, Fellsway East and a portion of the road through Blue Hills Reservation east of Randolph Avenue reconstructed.

IV. PARKS AND RESERVATIONS

The usual work of maintenance and upkeep of the parks, reservations and boulevards has been continued during the year. The public has made use of the metropolitan areas and roadways much the same as in preceding years. Auto-

mobile travel on the parkways and boulevards is heavier each year. The unusually cool and wet summer resulted in a decreased patronage of the public bath houses and there seems to be a growing tendency for bathers to dress at home and drive to and from the bathing resorts without using the public bath houses. The dressing facilities in the public bath houses are, however, still too small on hot summer holidays to accommodate all those who would use them.

The police force was increased during the year by the addition of ten permanent officers, but the temporary summer force was decreased from forty to twenty and the period of service cut from five to three months. These changes were made to allow a schedule of vacation periods for the permanent force throughout the year and has resulted in a more efficient summer force and in a net saving in pay-rolls. The force at the end of the year consisted of 1 Captain and Executive Officer, 5 captains, 5 lieutenants, 18 sergeants, 148 patrolmen and 1 police woman. During the year two officers have died, two have been discharged and twelve permanent new patrolmen have been added to the force. During the year 4,702 complaints and arrests were made, an increase over the preceding year, resulting in 4,234 convictions for which a total of \$34,308 in fines and 32 years in sentences were imposed.

The remaining life beneficiary under the Henry L. Pierce devise died within the year and this portion of that estate, consisting of about 155 acres adjoining the Blue Hills Reservation in Ponkapoag has now become available for public use.

The use of the Police Boat "Protector" of the Department of Public Safety was discontinued for ice breaking in the Charles River Basin for the winter season of 1927-8, and a private boat has been hired in its place.

During the summer months 120 band concerts were given in the various parks and reservations at a cost of \$18,842.80.

V. RAINFALL AND CONSUMPTION OF WATER

The precipitation and yield of the watersheds was much below normal during the first six months and far above normal during the last six months of the year. The total precipitation for the year was over 9 inches above normal for the Wachusett watershed. The Wachusett Reservoir was drawn down on January 14 to elevation 362.76, or 32.24 feet below high-water line, the lowest level since the reservoir first filled in 1908. The water rose to elevation 372.20, the highest point during the spring, the lowest spring filling since the reservoir first filled, or 11.05 feet lower than the maximum point of filling for 1926. The reservoir was drawn down to elevation 364.63 by July 30, since which date, due to the unusual rainfall, it has gradually filled and was at the end of the year at elevation 385.44, or 9.56 feet below high-water line.

The unusual rainfall during the last five months of the year has temporarily relieved the danger of a water shortage. During the last seven months of the year about 15 million gallons a day has been drawn from Lake Cochituate. The pipe lines and connections from the southern Sudbury reservoirs into the Sudbury Aqueduct and Reservoir have been completed by the Metropolitan District Water Supply Commission and these emergency supplies can be used if required.

During the year 48,358,569,000 gallons of water were furnished to the 18 cities and towns supplied, equivalent to a daily average consumption of 132,489,200 gallons, and for the estimated population of 1,344,560 at the rate of 98.5 gallons per capita, a little in excess of the rate in 1926.

VI. SPECIAL INVESTIGATIONS

In accordance with the provisions of Chapter 8 of the Resolves of 1927 the Commission investigated and reported as to the desirability, feasibility and cost to the cities and towns comprising the Metropolitan Parks District, of the control and maintenance of certain bridges and their approaches. The report is printed as House Document 2 of 1928.

In accordance with the provisions of Chapter 15 of the Resolves of 1927 the Commission investigated and reported on the advisability, expediency and cost

of constructing and maintaining overpasses or underpasses to carry traffic on Revere Beach Parkway across Main Street and Broadway in the City of Everett and Broadway in the City of Revere. The report is printed as House Document 3 of 1928.

In accordance with the provisions of Chapter 31 of the Resolves of 1927 the Commission investigated and reported on the advisability of changing the terms and conditions for admission to the Metropolitan Water District of any municipality, any part of which is within ten miles of the State House; also as to the advisability of enlarging the Metropolitan Water District, or of allowing certain municipalities to take water from the metropolitan supply, together with terms and conditions. The report is printed as House Document 74 of 1928.

In accordance with the provisions of Chapter 32 of the Resolves of 1927, the Commissioner of Mental Diseases, the Commissioner of the Metropolitan District Commission and the Commissioner of Public Health investigated, considered and reported upon the best practicable plan for the disposal of the sewage of the proposed state hospital to be located on land in Waltham, Belmont and Lexington. The report is printed as House Document 261 of 1928.

In accordance with the provisions of Chapter 42 of the Resolves of 1927 the Metropolitan District Commission and the Department of Public Health, acting jointly, considered and reported on the advisability of using water from the Charles River Basin for fire protection and sale for manufacturing purposes in the cities and towns adjacent to the basin and on the probable effect of such taking of water upon the use of the basin and its shores for the purposes designed and upon the sanitary condition of the shores and waters of the basin. The report is printed as House Document 73 of 1928.

VII. OTHER REPORTS

The reports of the Directors of Park Engineering, Water and Sewerage, with tables, statistics and financial statements, are hereby appended.

Respectfully submitted,

DAVIS B. KENISTON,

Metropolitan District Commissioner.

FEBRUARY 29, 1928.

REPORT OF THE DIRECTOR AND CHIEF ENGINEER OF PARK ENGINEERING

HON. DAVIS B. KENISTON, *Commissioner, Metropolitan District Commission.*

DEAR SIR: — I submit the following report of the work done under the direction and supervision of the Engineering Department of the Parks Division, during the year ending November 30, 1927.

Of the contracts let during 1926 on which the work had been in progress during the year, eight were not completed until the early part of this year, as follows:

Bridge for New York, New Haven & Hartford Railroad over Old Colony Parkway,
May 31, 1927.

Northern Traffic Artery, Bridge over Boston & Maine Railroad, June 14, 1927.

Grading and surfacing Northern Traffic Artery (two contracts) June 28, 1927.

River walls on Charles River Basin northerly of Broad Canal, March 16, 1927.

Grading near Cottage Farm Bridge approaches, February 5, 1927.

Grading and surfacing extension of Soldier's Field Road from North Harvard Street to Western Avenue, May 5, 1927.

John W. Weeks Bridge over Charles River Basin, April 30, 1927.

The work of building the Cottage Farm Bridge, contract for which was made in September, 1926, has been in progress since that time. On account of delays in obtaining steel for the railroad bridge, due to changes in design and other causes, the work will probably not be completed by the end of this year as had been expected and will require until next June or July.

During this year plans and specifications have been prepared and contracts let for work amounting to about \$1,100,000, which includes the following:

Dorchester Bay Bridge for Old Colony Parkway.

Northern Traffic Artery, between Lechmere and Broad Canals.

Surfacing Memorial Drive, Cambridge Parkway, Boylston Street to Western Avenue.

Wales Street Bridge between Newton and Wellesley.

Reconstruction and resurfacing roadways in Stony Brook Reservation.

Construction of Blue Hill River Road through the southerly section of Blue Hills Reservation from Hillside Street, Milton, to West Street, Braintree.

Several minor contracts have been let and considerable work done by the forces of the various divisions of the department. This work includes the installation of electric lighting system for 150 lamps with underground cable in Middlesex Fells Division and Charles River Reservation, and changing the electric lighting system of Memorial Drive, Cambridge Parkway, by installing 175 higher power lamps in place of the present small units; repairs to sea walls and additional shore protection at Revere Beach Reservation, Winthrop Shore Reservation and Lynn Shore Reservation; skating pond in Blue Hills Reservation at West Quincy; granolithic walks at Lynn Shore Reservation, Revere Beach Reservation and Middlesex Fells Parkway; new water main in Revere Beach Reservation; parking spaces at Nahant Beach Parkway; reconstruction of Malden Border Road, Fells-way East; and reconstruction of portion of road through Blue Hills Reservation, east of Randolph Avenue.

Surveys and plans have been made for Lynn Fells Parkway Extension to Newburyport Turnpike; acquirement of land along the Charles River in Dedham near Spring Street Bridge; acquirement of land for extension of West Roxbury Parkway along Newton Street to Hammond Street, Brookline; and Stoneham-Wakefield Parkway. Also plans for the construction of Furnace Brook Parkway Extension from Black's Creek to Sea Street, Quincy, and for Sanitary Buildings at Nantasket and Revere Beach Reservations.

The direction and supervision of all maintenance operations in the various divisions have been assigned by the Commission to the Engineering Division. An additional assistant was appointed in June to give special attention to this branch of the work and to study and investigate the organization and methods in use in each Division with a view to standardization and consolidation where possible.

The Engineering force, although varying somewhat during the year, has averaged as follows: one Chief Engineer; one Associate Civil Engineer; one Senior Civil Engineer; seven Assistant Civil Engineers; ten Junior Civil Engineers; thirteen Senior Engineering Aids; nineteen Junior Engineering Aids; two Bridge Inspectors; four Clerks and Stenographers; one Garage Foreman; one Chauffeur; one Supervisor of Machinery; one Supervisor of Park Maintenance and one Superintendent of Bridges; forty-five Lock and Drawbridge Assistants.

All work of maintenance and repairs to bridges and locks and operation of drawbridges and locks has been done under the direction and supervision of this Division.

The work of painting and repairing the lock gates at Charles River Dam was done between February 8 and March 3, 1927. This work necessitated the closing of the lock to traffic for two periods, from February 8 to 19, and from February 25 to March 3.

The work of breaking ice in the channels of the Charles River Basin and in Broad and Lechmere Canals for the season of 1926 and 1927, was done by the police boat owned by the Commonwealth and under the control of the Department of Public Safety. The total cost was \$8,899.75.

The following is a record of the traffic through locks and drawbridges during the year:

Charles River Dam and Locks

Number of openings, 4,763	Piling (lineal feet), 82
Number of vessels, 6,864	Sand (tons), 406,790
Number of boats, 2,517	Gravel (tons), 180,854
Lumber (feet B. M.), 2,074,000	Rubble stone (tons), 36,525
Coal (tons), 273,223	Granite (tons), 3,240
Oil (bbls.), 623,500	Miscellaneous (tons), 1,130
Empty barrels, 42,453	

There were 3,325 drawbridge openings.

Cradock Bridge Lock

Number of openings, 144	Number of boats over rollway, 152
Number of boats, 183	

Neponset Bridge

Number of openings, 346	Lumber (feet B. M.), 1,779,000
Number of vessels, 497	Sand (tons), 2,200
Coal (tons), 40,717	

Malden River Bridge

Number of openings, 421	Number of vessels, 780
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Saugus River Bridge

Number of openings, 771	Number of vessels, 1,080
-------------------------	--------------------------

Wellington Bridge

Number of openings, 162	Number of vessels, 218
-------------------------	------------------------

The Engineering Division has furnished supervision and inspection of work done by cities, towns, public service corporations and individuals to whom permits are issued to do work within the areas controlled by the Commission.

Surveys and staking of boundary and restriction lines where building operations are in progress and testing for encroachments have required considerable attention.

The cost of conducting the Division has been as follows:

Engineering:									
Construction:									
Services	.	.	.	.	.	.	.	.	\$85,180 92
Expenses	.	.	.	.	.	.	.	.	3,705 80
									<hr/>
									\$88,886 72
Maintenance:									
Services	.	.	.	.	.	.	.	.	\$42,032 86
Expenses	.	.	.	.	.	.	.	.	4,045 05
									<hr/>
									46,077 91
									<hr/>
Total	.	.	.	.	.	.	.	.	\$134,962 63

Respectfully submitted,
JOHN R. RABLIN,
Chief Engineer and Director of Park Engineering.

BOSTON, December 2, 1927.

Parkways:	Double Roadways Miles	Single Roadways Miles	
Alewife Brook	—	.70	
Blue Hills	1.46	1.61	
Cambridge ¹ . . . . .	.37	3.19	
Dedham	—	.89	
Fresh Pond	—	.50	
Furnace Brook	—	4.32	
Lynn Fells	—	1.05	
Lynnway	—	.68	
Middlesex Fells	4.10	1.77	
Mystic Valley	—	6.17	
Nahant Beach	—	.50	
Neponset River	—	.76	
Old Colony	—	1.71	
Revere Beach	1.45	3.73	
West Roxbury	—	2.85	
Winthrop	—	1.09	
Woburn	—	1.38	
	7.38*	32.90	32.90
* Equivalent in miles of single roadway			14.76

Highways transferred by or taken from cities and towns:

	Miles	
Alewife Brook Parkway . . . . .	.44	
Blue Hills Reservation	1.23	
Charles River Reservation . . . . .	.39	
Middlesex Fells Reservation	6.63	
Nantasket Beach Reservation . . . . .	.71	
		9.40

Lengths of automobile roads in reservations:

Blue Hills	5.35	
Charles River	2.80	
Middlesex Fells	4.06	
		12.21

Grand total 85.86

All above roads open to automobile traffic.

Length of Carriage Roads and Bridle Paths in Reservations

	Miles
Blue Hills Reservation	27.08
Middlesex Fells Reservation	14.55
Stony Brook Reservation	1.60
Beaver Brook Reservation . . . . .	.22
Charles River Reservation . . . . .	.89
Total	44.34

Lights in Parkway and Reservations

	Lights
Alewife Brook Parkway (arc lights)	10
Blue Hills Parkway (Welsbach gas)	80
Charles River Reservation, Upper Division, Soldier's Field Road, Arsenal Road and North Beacon Street, Arsenal Street Bridge (electric)	20

¹ Area included in Charles River Reservation.

	Lights
Charles River Reservation, Boston Embankment (electric)	106
Cambridge Parkway (electric)	202
Charles River Reservation, Lower Basin, Dam and Lock (arc)	16
Harvard Bridge (electric)	30
Western Avenue Bridge (electric)	14
Temporary Cottage Farm Bridge (electric)	10
Fresh Pond Parkway (electric)	15
Furnace Brook Parkway (Welsbach gas)	79
Furnace Brook Parkway (electric)	2
Lynn Fells Parkway (Welsbach naptha)	17
Lynn Shore Reservation (electric)	30
Lynnway (electric)	10
Middlesex Fells Parkway (Welsbach naptha)	60
Middlesex Fells Parkway (electric)	181
Middlesex Fells Reservation (Welsbach naptha)	24
Middlesex Fells Reservation (electric)	54
Mystic Valley Parkway (Welsbach naptha)	60
Mystic Valley Parkway (electric)	1
Nahant Beach Parkway (electric)	7 ¹
Nantasket Beach Reservation (electric)	29 ²
Old Colony Parkway (electric)	46
Quincy Shore Reservation (Welsbach gas)	78
Revere Beach Parkway (electric)	181
Revere Beach Reservation (electric)	119 ³
Winthrop Parkway (Welsbach naptha)	6
Winthrop Parkway (electric)	19
Winthrop Shore Reservation (electric)	7
Total	1,513

Miles of Seashore

	Miles
Lynn Shore	1.50
Nahant Beach	3.92
Revere Beach	2.74
Winthrop Shore	1.71
Nantasket Beach	1.02
Quincy Shore	2.19
Total	13.08

Lengths of Sea Walls

	Miles
Lynn Shore	1.30
Revere Beach at Northern Circle	.08
Revere Beach at Eliot Circle	.15
Revere Beach, shore protection, bath house shelter and Revere Street shelter	.29
Revere Beach, shore protection, south of Northern Circle	.28
Winthrop Shore, bridge to Great Head	1.04
Winthrop Shore, bridge to Grover's Cliff	.23
Quincy Shore Reservation, shore protection, south of Webster Street	1.08
Quincy Shore Reservation, southerly end	.15

¹ Five additional lights, June 1 to December 1.
² Five additional lights in summer.
³ Thirty-three electric all night, May 1 to October 31. Thirty-three electric to midnight, June 1 to September 30. Six all night, May 1 to September 30.

	Miles
Nantasket Beach Reservation . . . . .	.54
Winthrop Parkway, near Leverett Avenue, Revere and Winthrop Broad Sound Avenue to Sewall Avenue . . . . .	.52
Total	5.66

<i>Miles of River Bank</i>		Miles
Charles River		33.34
Mystic River		8.16
Neponset River		15.86
Alewife Brook		4.50
Total		61.86

<i>Bridges</i>		
Reinforced concrete bridges		17
Steel bridges		12
Wooden bridges		8 ¹
Drawbridges		6
Footbridges		12
Total		55

<i>Culverts</i>		
Reinforced concrete and other masonry culverts		42

<i>Dams</i>		
Beaver Brook Reservation, small wooden dams		2
Blue Hills Reservation, small wooden dam		1
Charles River Reservation, wooden dam at Watertown, 220 feet in length		1
Charles River Reservation, Charles River Basin tidal dam, 1,200 feet in length		1
Charles River Reservation, small stone dam in branch below Washing- ton Street, Newton Lower Falls		1
Charles River Reservation, reinforced concrete dam at Washington Street, Newton Lower Falls, 175 feet in length		1
Furnace Brook Parkway, reinforced concrete dam upstream from Black's Creek Bridge		1
Hemlock Gorge Reservation, small stone masonry dam with stop planks, in gorge		1
Hemlock Gorge Reservation, small reinforced concrete dam on East Branch of river, Newton Upper Falls		1
Hemlock Gorge Reservation, reinforced concrete dam in Charles River at Boylston Street, Newton Upper Falls, 90 feet in length		1
Mystic River Reservation, reinforced concrete tidal dam at Cradock Bridge, 100 feet in length; weirs 400 feet in length		1
Total		12

<i>Lock Gates, Sluice Gates and Tide Gates</i>	
Charles River Reservation, Charles River Basin tidal dam, 6 lock gates, 13 sluice gates, 43 tide gates.	
Mystic River Reservation, Cradock Bridge tidal dam, 2 lock gates, 4 sluice gates, 8 tide gates.	
Quincy Shore Reservation, 8 tide gates.	
Revere Beach Parkway, 1 tide gate.	

¹ One-half of Wellington bridge rebuilt with concrete girders.

Police Signal System

	Miles
Blue Hills Division	31½
Middlesex Fells Division	18¼
Nantasket Beach Division	2½
Charles River Reservation	10
Fresh Pond Parkway	½
Total	62¾

Revere Beach Division police signal system, serving 11 miles of parkways and reservations, and Middlesex Fells Division, serving 1½ miles of parkway, on wires leased from the New England Telephone and Telegraph Company.

REPORT OF THE DIRECTOR AND CHIEF
ENGINEER OF WATER DIVISION

DAVIS B. KENISTON, *Commissioner, Metropolitan District Commission.*

SIR: — I respectfully submit the following report of the construction and maintenance operations of the Water Division for the calendar year 1927.

ORGANIZATION

The number of supervising, clerical and engineering employees was 53. A labor force including 290 employees at the beginning and 289 at the end of the year was engaged in maintaining and operating the reservoirs, aqueducts, pipe lines, hydroelectric and pumping stations and in doing miscellaneous construction work. The average number of employees of all classes for the entire year was 366.

METROPOLITAN WATER DISTRICT AND WORKS

The Water District now includes 20 municipalities with an area of about 174 square miles and population as of July 1, 1927, of 1,445,110. The Water Works lands include an area of about 19,000 acres, of which about 2,000 acres have been planted with pine trees. The works include 9 storage reservoirs with 200 square miles of tributary watershed, a total storage capacity of 80 billion gallons and water surface of 8,600 acres; 60 miles of aqueducts; 2 hydroelectric power stations of a capacity of 7,000 horse power; 16 miles of high-tension power transmission line; 5 distribution pumping stations with a combined equipment of 6,560 horse power and pumping capacity of 280 million gallons a day; 12 distribution reservoirs with a capacity of 2½ billion gallons, and 148.84 miles of distribution mains. The consumption of water from the Metropolitan Water Works during the year by the 18 municipalities regularly supplied was 48,358,569,000 gallons, equivalent to an average daily consumption of 132,489,200 gallons or 98.5 gallons per capita for a population of 1,344,560 in the district supplied.

CONSTRUCTION

IMPROVEMENT OF SERVICE IN WATERTOWN

Work on the Watertown Branch of the Weston Aqueduct Supply Mains under a contract with the C. & R. Construction Company, which was nearly completed in 1926, was resumed April 20 and was finished May 13, with the exception of the work of resurfacing the streets and sidewalks in Waltham. The Contractor arranged with the city of Waltham to do this resurfacing at the Company's expense in connection with the work of widening and improving River Street, and the city completed the work September 7. The total value of the work done for the Watertown Branch under the contract in 1926 and 1927 is \$72,298.23.

SOUTHERN HIGH SERVICE PIPE LINES

A contract was made with the Biggs Construction Company of Akron, Ohio, March 10, for furnishing and laying a line of riveted steel pipes 54 inches in diameter, extending easterly from Chestnut Hill Pumping Station No. 1 for a distance of about 13,500 feet to the Arborway at Pond Street in Jamaica Plain. This pipe line will reinforce the southern high service supply for Boston, Milton and Quincy. For a distance of 4,360 feet the pipe line is located in public streets and for the remaining distance in private lands and private ways through which easements were taken March 10 for the pipe line location. Trench excavation was begun May 18. The work was delayed by unusually wet weather and at the close of the year there was a gap about 300 feet in length near the easterly end of the line where the pipes had not been laid and considerable refilling of trenches and resurfacing in private lands had not been completed. The value of the work done under the contract is \$275,175.25, of which \$17,640 is for rock excavation.

METERS AND CONNECTIONS

During the year Venturi meters were installed and connections were made between the new 30-inch main and the local distribution system in Pleasant Street, Watertown, and between the new 54-inch main and the local distribution system in the Arborway in Boston. The expenditures for this work during the year amount to \$12,071.56.

CHLORINATING APPARATUS

Chlorinating apparatus was installed in the intermediate gatehouse at Chestnut Hill Reservoir early in the year for chlorinating the water drawn for consumption from Lake Cochituate. This installation cost \$2,740.28 and was put into service June 28.

IMPROVEMENT OF WACHUSETT WATERSHED

For improving the Wachusett watershed 8.09 acres of land on Salisbury Street in Holden, with the buildings thereon, was acquired from Harry G. and Sophia P. Waite on February 16.

PROPOSED EXTENSIONS OF THE WORKS

A contract was made with the Murray Iron Works Company of Burlington, Iowa, December 1, for furnishing and installing in the Arlington Pumping Station a new cross compound crank and fly wheel pumping engine with a capacity of 3 million gallons a day, and the work was progressing favorably at the close of the year.

Surveys for the proposed northern high-service pipe line were in progress during the year and are completed for the portion of the line from Main Street in Malden to Broadway in Revere.

Considerable work has been done during the year on surveys and investigations for the proposed Weston Aqueduct Supply Main from Weston, through Newton and the Brighton district of Boston, to connect with the pipe lines laid in 1926 on the Western Avenue and River Street bridges over the Charles River for reinforcing both of the 48-inch low service lines from Chestnut Hill Pumping Station to Spot Pond.

MAINTENANCE

PRECIPITATION AND YIELD OF WATERSHEDS

During the first half of the year there was an unusual deficiency of precipitation on all of the watersheds. The variation from normal was more than 5 inches on the Wachusett, more than 7 inches on the Sudbury and more than 6 inches on the Cochituate watershed. This was offset, however, by excessive precipitation during the last half of the year; the excess above the normal amounting to nearly 15 inches on the Wachusett, more than 13 inches on the Sudbury and more than 9 inches on the Cochituate watershed.

The total precipitation for the entire year was 54.67 inches or 9.31 inches above the average for 31 years on the Wachusett watershed, 50.73 inches or 6.14 inches above the average for 53 years on the Sudbury watershed and 48.22 inches or 3.13 inches above the average for 65 years on the Cochituate watershed. The precipitation of 8 to 9½ inches on all the watersheds in August, and of 7.50 and 8.21 inches, respectively, on the Wachusett and Sudbury watersheds in November, are especially noticeable.

The average daily yield per square mile from the watersheds was 1,389,000 gallons from the Wachusett, which is 27 per cent above the average for 31 years, 1,411,000 gallons from the Sudbury watershed, which is 44 per cent above the average for 53 years and 1,145,000 gallons from the Cochituate watershed, which is 23 per cent above the average for 65 years.

The city of Worcester discharged 256,300,000 gallons of water into the Wachusett Reservoir watershed from the area formerly tributary to the Wachusett Reservoir and diverted by the city in 1911. This water was received during November and December and as the water did not rise to elevation 395 in the Wachusett Reservoir before June 15, payment to the city for this water at the rate of \$2 a million gallons is required under the agreement made with the city, November 2, 1914.

STORAGE RESERVOIRS

The capacities of the storage reservoirs of the Metropolitan Water Works, the elevation of the water surfaces and the quantity of water stored in each reservoir at the beginning and at the end of the year are shown by the following table: —

STORAGE RESERVOIRS	Eleva- tion ¹ of High Water	Capacity (Gallons)	JAN. 1, 1927		JAN. 1, 1928	
			Eleva- tion ¹ of Water Sur- face	Amount Stored (Gallons)	Eleva- tion ¹ of Water Sur- face	Amount Stored (Gallons)
Cochituate Watershed: —						
Lake Cochituate ²	144.36	2,097,100,000	143.70	1,940,600,000	143.72	1,945,300,000
Sudbury Watershed: —						
Sudbury Reservoir	260.00	7,253,500,000	257.01	6,017,600,000	257.46	6,200,700,000
Framingham Reservoir No. 1	169.32	289,900,000 ³	167.83	221,700,000	168.10	233,400,000
Framingham Reservoir No. 2	177.87	529,900,000 ³	176.08	485,200,000	176.36	497,200,000
Framingham Reservoir No. 3	186.74	1,180,000,000 ³	184.67	1,032,700,000	185.09	1,066,200,000
Ashland Reservoir	225.21	1,416,400,000	224.51	1,377,900,000	224.58	1,381,700,000
Hopkinton Reservoir	305.00	1,520,900,000	304.16	1,468,300,000	304.40	1,483,300,000
Whitehall Reservoir	337.91	1,256,900,000	337.14	1,107,200,000	337.03	1,086,100,000
Farm Pond	159.25	167,500,000	159.49	180,500,000	159.52	182,100,000
Wachusett Watershed: —						
Wachusett Reservoir	395.00	64,968,000,000	363.26	30,679,200,000	385.44	52,617,600,000
Totals	—	80,680,100,000	—	44,510,900,000	—	66,693,600,000

¹ Elevation in feet above Boston City Base.
² Excluding Dudley Pond which was abandoned April 3, 1916.
³ To top of flashboards.

The table shows the total storage which could be drained from the reservoirs. Special provisions would be necessary, however, to draw about 10 billion gallons of this storage for consumption, as it is below the outlet channels which can be conveniently used for regular service.

Wachusett Reservoir

At the beginning of the year the water was up to elevation 363.26 with 30,679,300,000 gallons in storage. By January 14 the water was down to elevation 362.76, or 32.24 feet below the designed high-water line, with 30,274,500,000 gallons in storage. This is the lowest stage recorded since the reservoir first filled in the spring of 1908.

The water in the reservoir rose slowly and continuously from January 14 to March 8, then rapidly until March 28; during the following week only a slight change occurred, and on April 4 the water was at elevation 372.20 the highest point reached during the spring and the lowest spring peak of any year since the reservoir first filled. The water was then 22.80 feet below the high-water line, with 38,473,200,000 gallons in storage.

From April 14 to July 30 the draft from the reservoir exceeded the inflow and the water went down at the rate of about 2 feet a month to elevation 364.63. Following heavy rainfall in August the water rose in the reservoir at the rate of about 2 feet a month until November 3.

As a result of the unusually heavy rainfall during the remainder of the year the water rose in the reservoir at the rate of about 7 feet a month and was up to elevation 385.44 or 9.56 feet below high-water line at the end of the year, with 52,617,600,000 gallons in storage, a gain in storage of 21,938,300,000 gallons during the year.

In compliance with General Laws, chapter 92, section 14, there was discharged into the Nashua River from the reservoir 625,500,000 gallons of water to maintain a flow in the river below the dam.

The town of Clinton pumped 35,600,000 gallons of water from the Wachusett supply under the provisions of Acts of 1923, chapter 348. A portion of this water was used because of the poor quality of the water in the town's storage reservoir in July, August and September.

The city of Worcester did not pump water from the Wachusett Reservoir during the year.

The fencing of the reservoir lands, begun in 1921, was continued for a distance of 2.4 miles, making a total of about 29½ miles now completed.

The Metropolitan District Water Supply Commission constructed a portion of a 22,000 volt transmission line, for delivery of electric power to the contractors on the new tunnel, along the shore of the Wachusett Reservoir in West Boylston and of the Quinapoxet River in Holden on Water Division land for a distance of about 2¾ miles, and is using about 10 acres of Water Division land near the circular dam at the mouth of the Quinapoxet River in West Boylston for the operations at Shaft No. 1 of the new tunnel. This necessitated an expenditure of \$912 by the Water Division for transplanting 2,183 red pine trees 4 to 8 feet high and the building of 480 feet of wire fence.

The usual work of cutting and burning brush and weeds along the margins of the reservoir, the sides of adjacent highways and of the brooks and rivers which flow directly into the reservoir and at the North and South dikes has been done at a cost of \$4,485.

All perennials over 6 inches high were pulled from about 1,200 acres of the exposed reservoir bottom above elevation 373 at a cost of \$1,700. Removal of the smaller perennials and the annuals from this area was not attempted.

The Department buildings near the dam in Clinton and on the reservoir lands in Boylston, West Boylston and Sterling have been kept in good order. A new barn was built at the foreman's headquarters in Lancaster Street in West Boylston in place of the barn that was struck by lightning and destroyed by fire in October, 1926, and a new horse was purchased to replace the one lost in the fire.

Sudbury Reservoir

At the beginning of the year the water in the Sudbury Reservoir was about 2 feet below the crest of the overflow which at this reservoir is at elevation 259. The water was kept between 1.4 feet and 2.3 feet below the crest until April 18 when the flashboards were put on the overflow. The water was then kept slightly above the crest until the flashboards were taken off November 28 and thereafter until the end of the year the water was kept about 1.5 feet below the crest. No water overflowed from the reservoir during the year.

During November and December the Metropolitan District Water Supply Commission discharged 116,400,000 gallons of water from the Hopkinton Reservoir into the Sudbury Reservoir in testing the new pipe lines and pumping station

which it had constructed for diverting water from the portion of the Sudbury watershed above the Hopkinton and Cordaville dams into the Sudbury Reservoir, but on account of the large yield of water of better quality from the portion of the Sudbury watershed above the dam of Framingham Reservoir No. 3 and the Wachusett and Lake Cochituate watersheds the new works have not been put into regular service. The usual work has been done on the Sudbury Reservoir lands and structures.

Framingham Reservoir No. 3

The flashboards were kept on the overflow of the dam at Framingham Reservoir No. 3 during the entire year, as usual. The water was drawn to elevation 182.53 in February and rose to the top of the flashboards, elevation 186.50 in November, but no water overflowed from the reservoir. The grounds and structures received the usual care.

Framingham Reservoirs Nos. 1 and 2, Ashland, Hopkinton and Whitehall Reservoirs and Farm Pond

The maintenance operations at the reservoirs in the southern portion of the Sudbury watershed have been unusual on account of the construction work in this area by the Metropolitan District Water Supply Commission, and in connection therewith the water was lowered in Framingham Reservoirs Nos. 1 and 2 beginning on July 30, and was kept down until December 12, when the waste gates were closed and the reservoirs were allowed to fill. The water was kept above the usual elevation in the Ashland, Hopkinton and Whitehall reservoirs until the latter part of the year when it became evident that it would not be required for consumption.

On account of the heavy rainfall on November 3, while construction work was in progress at the outlet of Whitehall Reservoir, the water rose 1.12 feet in less than 24 hours, to elevation 339.12 and 1.21 feet above elevation 337.91, the normal high-water line, the record height for this reservoir and practically to the top of the dam at the outlet.

There are now 86 camps on the land adjoining Whitehall Reservoir, as one camp was destroyed by fire and another was removed during the year.

The changes made during the year in the existing southern Sudbury works include the installation of chlorine control apparatus in the gate-house at Framingham Dam No. 1; the removal of the old sluice gates Nos. 3, 6 and 7, and installation of a new 20-inch gate valve and 24-inch overflow pipe at Framingham Dam No. 2; the installation of a 48-inch by 30-inch sluice gate on the westerly 48-inch waste pipe in the gate-house at Ashland Reservoir and on the easterly 48-inch waste pipe of a 30-inch by 20-inch branch with 20-inch gate valve and Venturi meter on the branch line and a 20-inch blow-off valve on the main pipe near its outer end; the installation in the westerly 48-inch waste pipe at the Hopkinton Dam of a 36-inch by 24-inch branch with a 24-inch gate valve on the branch line and a 36-inch blow-off valve on the main line, the removal of the easterly flap-gate and building in of a 20-inch pipe line in front of the easterly sluice gate at the gate-house at Whitehall Reservoir.

Farm Pond is not used now by the Metropolitan Water District or the town of Framingham for water supply. In the latter part of the year 213,800,000 gallons of water was wasted from the pond into the Sudbury River. Water in the pond rose to an unusual height, elevation 159.89, following the heavy rainfall of November 3.

Under rights reserved by legislation the Boston & Albany Railroad took approximately 70,700,000 gallons of water and the New York, New Haven & Hartford Railroad took approximately 58,400,000 gallons of water from Farm Pond for use in locomotives.

Lake Cochituate

The water in Lake Cochituate has been near the normal high-water line, elevation 144.36, during the entire year and was at the lowest stage, elevation 142.23, in February, and at the highest stage, elevation 144.83, in May.

Water was drawn from the lake for consumption beginning January 4, but on account of an objectionable taste and odor, caused by an abundant growth of microscopic organisms, the use of the water was stopped on January 20. To remedy this condition copper sulphate was applied to the water as an algæcide. During the last week in April 4,100 pounds of copper sulphate was applied to the water in the lake; this was equivalent to 2 pounds to a million gallons of water. A second application of 5,125 pounds of copper sulphate, equivalent to $2\frac{1}{2}$ pounds to a million gallons of water, was made May 12 to 14, inclusive, and a third application of 6,150 pounds, equivalent to 3 pounds to a million gallons of water, was made June 6 to 9 inclusive. On June 24 the use of water from the lake was resumed and as the water has since then been of satisfactory quality, its use was continued until the end of the year; the usual draft was at the rate of about 15 million gallons a day. The total quantity of water used from the lake during the year was 2,465,200,000 gallons, all of which was sterilized with chlorine as it flowed from the Cochituate Aqueduct into the Chestnut Hill Reservoir. During the year 4,486,100,000 gallons of water was wasted from the lake at the dam.

The usual care was taken of the water works lands and structures at the lake.

There are now 217 cottages, 67 garages and 4 stables on the private lands adjoining the water works lands on the shore of the lake.

AQUEDUCTS

The Wachusett Aqueduct was in regular use except from November 4 to December 4, inclusive, and water was drawn from the Wachusett Reservoir through the aqueduct on 274 days. The total quantity drawn was 32,363,300,000 gallons, equivalent to an average flow of 88,667,000 gallons a day for the entire year. All of the water was used for the generation of electric energy at the power station before it was discharged into the aqueduct.

The Westborough State Hospital pumped 99,810,000 gallons of water from the aqueduct at the terminal chamber during the year, an average consumption of 251,500 gallons a day.

The Weston Aqueduct was in regular use throughout the year and delivered to the Weston Reservoir and Supply Pipe Lines 36,958,100,000 gallons of water, an average of 101,255,000 gallons a day, all of which was used for generating electric energy at the Sudbury power station before it was discharged into the aqueduct.

The Sudbury Aqueduct was in regular use throughout the year. The entire supply for this aqueduct, amounting to 8,642,100,000 gallons was drawn from Framingham Reservoir No. 3. The town of Framingham pumped 511,043,889 gallons of this water for its supply and the remainder 8,131,000,000 gallons, equivalent to an average of 22,277,000 gallons a day, was delivered to Chestnut Hill Reservoir for use in the Metropolitan Water District.

The Cochituate Aqueduct was in use from January 4 to January 20 and from June 24 to the end of the year, with the exception of November 7 and 8, a total of 206 days. During this time 2,465,200,000 gallons of water was drawn from Lake Cochituate through the aqueduct, the equivalent of an average flow of 6,753,000 gallons a day for the entire year.

The total quantity of water drawn from the storage reservoirs through the aqueducts for consumption is 804,269,000 gallons less than the total water supplied from the Distribution Works; this difference is accounted for by making reasonable allowance for the yield of the Spot Pond watershed, for leakage of ground water into the aqueducts and for the different methods of measurement of these large volumes of water, and indicates that leakage from the distribution mains must be very small.

The ordinary maintenance of these aqueducts has been attended to by the regular maintenance forces in the usual manner. A cave-in occurred on the Weston Aqueduct, over tunnel No. 1, about 310 feet east of the head-house, without affecting the structure in any way. About 75 cubic yards of earth were used in refilling the cavity.

The brick facing on the northerly side of the Sudbury Aqueduct, where it is located on the Waban Valley Bridge in Wellesley, was entirely rebuilt as it had

been loosened and forced out of place by the freezing of the water that had leaked down from the floor of the bridge which forms the roof over the aqueduct. In connection with this work the joints in the masonry floor were repointed with elastic cement. The cost of the repairs was \$7,393.75 for masons and helpers and \$1,642.97 for materials used.

PROTECTION OF WATER SUPPLY

At the beginning of the year the usual force, including a sanitary inspector, 2 watershed inspectors and 3 watchmen were employed inspecting the condition of premises on the watersheds, ice-cutting operations and preventing pollution of the water supply. Since July 20 three additional watchmen have been employed on account of the contemplated use of water from the Ashland, Hopkinton and Whitehall reservoirs which had not been used for many years.

The sewage from the Worcester County Training School in West Boylston was purified by filtration throughout the year and the sewage from the summer cottages near Gates Terrace, at Sterling Junction, was purified from May 1 to September 30, inclusive.

The surface water from the village of Sterling, the brook near Maple Street in Marlborough and Pegan Brook in Natick has been purified by filtration, with the exception of large flows in excess of the capacity of the filters which was sterilized with calcium hypochlorite.

The Pegan pumping station was operated on 298 days and 389,051,000 gallons of water was pumped to the filters, an average of 1,065,893 gallons per day for the entire year. The cost of operating the station, including the care of the grounds and filters, was \$5,776.45 for labor, \$711.36 for fuel and \$819.65 for supplies and repairs, a total of \$7,307.46 and \$18.78 per million gallons filtered. The fuel cost per million foot gallons was 12.98 cents. A small earth dam was built across the so-called bed No. 6, near its westerly end, to keep the unfiltered water from reaching what appears to be a rock fill under the railroad and through it entering the lake without being filtered at all.

Following the heavy rain of November 3 the water in Beaver Dam Brook was sterilized with calcium hypochlorite for a period of 13 days as it flowed past the Mill Street Bridge into Lake Cochituate.

The cost of protecting the water supply by filtration and chlorination was \$948 on the Wachusett watershed, \$5,375 on the Sudbury watershed and about \$7,735 on the Cochituate watershed.

The usual work of caring for the ditches, culverts and watering places and improving brook channels was accomplished.

The cost of maintaining the 37 miles of drainage ditches on all of the watersheds was about \$6,530, considerable repair work being necessary.

The number of manufacturing plants on the watershed was reduced this year by the burning of the Buck chair-finishing factory in Sterling Center on June 2 and the Sterling cider mill on November 4, and by the purchase of the Noack shoddy mill in Holden by the Metropolitan District Water Supply Commission on August 9. There are now only three mills left on the watershed and of these only the Jefferson Manufacturing Company in Eagleville and Buck's chair factory in West Sterling are running at present.

New filter-beds were built at the Fay School in Southborough in accordance with plans approved by the Division.

Because of the lack of demand for woolen blankets the Cordaville Woolen Company changed in the fall of 1926 from the manufacture of blankets to tweeds and suede velours. This business not proving successful they finally closed the mill permanently the latter part of January, 1927, and offered the plant for sale.

About two years ago a public dump was started at the edge of Cedar Swamp, on the Cordaville Road, just below the village of Hopkinton. As no serious attempt was made by the town authorities to keep it in order or to prevent pollution of the water supply it was cleaned up by the Division in preparation for the contemplated use of Hopkinton Reservoir for water supply.

In connection with the building of a large gas generating plant by the West

Boston Gas Company on the swampy area adjoining Beaver Dam Brook near Irving Street in Framingham, sedimentation basins and filter-beds were constructed to prevent pollution of the water in the brook.

All of the mill buildings and all but three of the dwellings have now been removed at the Dawson Mill property on Salisbury Street in Holden, which was acquired in 1926.

Since early in June the Division has cared for the mill property at West Rutland in the Ware River watershed. This property was acquired from the Rutland Worsted Company by the Metropolitan District Water Supply Commission on June 1. It includes 107 acres of land and water rights in Demond Pond, which has an area of about 120 acres. The mill is located at the middle water privilege; the upper and lower privileges had not been used in recent years. All of the other buildings in the surrounding village, with the exception of the school-house and one or two dwellings, were owned by the Company, and of these nine dwellings are now occupied by tenants of the Commonwealth.

CLINTON SEWAGE DISPOSAL

The works for disposing of the sewage of the town of Clinton were operated throughout the year, as required by Acts of 1898, chapter 557 and 570, 847,000 gallons of sewage was pumped to the filters, an average of 1,564,000 gallons a day.

During the heavy rain storm of November 4 about 60 linear feet of the intercepting sewer embankment was washed out, crushing the 24-inch vitrified pipe and for nine days, while repairs were being made, a portion of the sewage flowed directly into the Nashua River. The cost of the repairs was \$941.33. A portion of the sewage also overflowed into the river on six days in September when the flow exceeded the capacity of the pump. From September 19 to October 16, inclusive, a portion of the sewage was discharged on the low land near the filters, while the sludge tanks and filter-beds were being prepared for winter service.

The volume of sewage to be disposed of now exceeds the capacity of the existing works and extensive improvements should be made in order to dispose of it in a satisfactory manner.

The requirement of the town of Clinton that the overhead wires in High and Mechanic streets should be removed, necessitated the removal of 3,300 feet of the power transmission line over which the electric energy is transmitted from the Wachusett Power Station to the sewerage pumping station and the installation of a new line in Chestnut and Water streets, for a distance of 3,900 feet, at a cost of \$1,461.49. As the bronze runners and wearing rings of the pump were giving unsatisfactory service, a set of manganese steel runners and rings was installed September 12 at a cost of \$491.60, with satisfactory results.

For the past year the cost of operating the pumping station, including the unusual expense for transmission line and pump, was \$5,232.01 or \$9.17 per million gallons of sewage pumped. The cost of operating the filters and intercepting sewer, including the unusual expenditures for repairing the sewer, was \$11,015.37 or \$19.30 a million gallons of sewage disposed of.

FORESTRY

In the Wachusett Section about 2,800 4-year old white spruce seedlings were planted on Water Works land bordering the open channel portion of the Wachusett Aqueduct in Marlborough and Southborough and on the margins of the Wachusett Reservoir in Boylston and West Boylston. About 1,400 white pine and cedar trees 4 to 6 feet high were transplanted from a natural stand in Big Crane Swamp in Westborough to aqueduct land near the terminal chamber in Northborough. This was the only new planting done during the year.

In the Sudbury Section 155 red pines and 2,426 white pines were set out to replace dead trees in former plantings and 7,628 pine trees from 3 to 15 feet in height were destroyed by fires.

The usual work was done clearing areas for future planting, making improve-

ment thinnings and cutting mature and diseased trees for fence posts, destroying insects and clearing fire guards.

The total expenditure for forestry was \$33,976.13, of which \$3,415.83 was expended for protecting the trees and plantings from insects.

HYDROELECTRIC SERVICE

During the year 9,255,594 kilowatt hours of electric energy were delivered from the hydroelectric stations operated by water drawn from the Wachusett and Sudbury reservoirs.

The total value of this energy at contract prices and including rentals of \$182.20 for transmission line locations is \$52,547.39. The total expense charged to operation of both stations and transmission lines is \$54,223.41, leaving a loss from the operation of the stations of \$1,676.02. This loss is due principally to the unusual repairs, costing about \$4,600, on Unit No. 4, and the reduced output at the Wachusett Station on account of the low water in the reservoir, and to the reduced output and increased expense of three shift operation at the Sudbury Station on account of the increased quantity of water supplied to the District by gravity through the Weston Aqueduct since the completion of the new supply main for the northern low service.

The Wachusett Power Station was operated on 274 days. The statistics for the year 1927 are as follows:

Total energy developed (kilowatt hours)	5,405,600
Energy used at power station (kilowatt hours)	192,190
Available energy (kilowatt hours)	5,213,410
Water used (gallons)	32,363,300,000
Average head (feet)	74.4
Energy developed per million foot gallons (kilowatt hours)	2.245
Efficiency of station (per cent)	71.44

Credits:

Energy sold New England Power Company and Edison Electric Illuminating Company 4,995,774 kilowatt hours at \$0.0053	\$26,477 60
Deduction of 2 per cent as provided in contract, 99,915 kilowatt hours at \$0.0053	529 55
	\$25,948 05
Energy furnished Clinton Sewerage Pumping Station, 217,636 kilowatt hours at \$0.0053	1,153 47
Rental, transmission line location	182 20
	\$27,283 72

Charges:

Superintendence	\$1,536 30
Labor, operating station	8,758 38
Repairs and supplies:	
Power Station	5,401 42
Transmission line	65 16
	\$15,761 26
Taxes	2,687 50
Administration, general supervision, interest and sinking fund	11,258 63
	29,707 39
Loss	\$2,423 67
Cost of available energy per thousand kilowatt hours	\$5.698

The Sudbury Power Station was in service on 365 days. The statistics for the year 1927 are as follows:

Total energy developed (kilowatt hours)	4,113,410	
Energy used at power station (kilowatt hours)	71,226	
		<hr/>
Available energy (kilowatt hours)		4,042,184
Framingham Reservoir No. 3 service:		
Water used (gallons)		7,046,600,000
Average head (feet)		65.39
Weston Aqueduct service:		
Water used (gallons)		36,958,100,000
Average head (feet)		38.18
Energy developed per million foot gallons (kilowatt hours)		2.197
Efficiency of station (per cent)		70.0
Credits:		
Energy sold Edison Electric Illuminating Company of Boston, 4,042,184 kilowatt hours at \$0.00625		\$25,263 67
Charges:		
Superintendence	\$1,569 14	
Labor, operating station	13,944 21	
Repairs and supplies	858 98	
		<hr/>
		\$16,372 33
Taxes	1,934 40	
Administration, general supervision, interest and sinking fund	6,209 29	
		<hr/>
		24,516 02
Profit		<hr/>
		\$747 65
Cost of available energy per thousand kilowatt hours		\$6.065

DISTRIBUTION PUMPING STATIONS

The total pumpage at the five distribution pumping stations during 1927 was 25.208 billion gallons or 0.121 billion gallons more than in 1926. This slight increase in pumping over the former year is more than accounted for by an increase of 0.358 billion gallons pumped for the city of Newton to supplement its own supply while improvements which the city is making in its works were in progress.

At the beginning of the year there were 1,085 net tons of bituminous coal and 75 net tons of anthracite screenings on hand at the pumping stations. During the year 11,125 net tons of bituminous coal and 228 net tons of anthracite screenings were received. At the close of the year 1,909 net tons of bituminous coal and 62 net tons of anthracite screenings were on hand at the pumping stations.

At Chestnut Hill Pumping Station No. 1, Engine No. 1 which has been in service 40 years was put in good condition for short runs because of the convenience of using its small capacity at times to make up a small deficiency in supply during peak load periods which otherwise would have to be made up by operating one of the modern engines of much larger capacity than required for the demand. The lubricating system of Engine No. 3 and jacket piping and drips on this engine have been very much simplified and changes have been made to facilitate the starting of the engine. The cylinder valve stems and dependent air compressor on Engine No. 4 were repacked. New force main gages were installed for each of these engines. The brass hooks of the high and low pressure cylinder inlet valve gears on Engine No. 16 which had become worn were replaced with steel hooks. New wedge bolts for connecting rod boxes and new box for the low pressure crank connection bearing were installed and other repairs and adjustments made on Engine No. 16. The main bearing boxes on the electric lighting engine were rebabbitted and a steel coupling was installed on the main shaft in place of

the cast-iron split coupling. A gravity oiling system was installed on this unit. The five boilers at this station have been regularly inspected and necessary repairs and some improvements have been made to the equipment, which is in good order. Pressure piping and control valves were installed for operating two new hydraulic valves on the force mains in the rear of the station.

At Chestnut Hill Station No. 2 pump valves and packings were renewed on low-service engines Nos. 5, 6 and 7. A broken stem on No. 5 valve on the equalizer pipe was replaced. High-service engine No. 12 was in continuous operation for eleven months, except for a few necessary interruptions of short duration for renewals of pump valves and repacking of dependent boiler feed pump plungers and other minor repairs and adjustments, but on account of an accident which occurred at 12.10 A.M. December 1 the engine was out of service for repairs the remainder of the year. Apparently one of the $\frac{3}{4}$ -inch stud bolts on the front top poppet valve of the low pressure cylinder became loose and dropped down on top of the piston which, on its upward stroke, forced the bolt up against and broke the valve, parts of which also dropped down on the piston and were forced up against and cracked the cylinder head. The necessary repair parts were immediately ordered by telephone from the engine builder's shop, including piston rod and nuts and two poppet valve discs of an improved design, without the stud bolts which had caused the accident. The two old poppet valve seats were turned true at the Atlantic Works in East Boston and the crack in the cylinder head was brazed by a man from these works with an acetylene torch. Repairs were completed at the close of the year with the exception of some of the erecting work and necessary adjustments. While waiting for the new parts to arrive from the shop a large amount of general repair work was done on other parts of the engine. Expenditures for repairing the damage resulting from this accident and of making the other repairs amount to about \$4,000. The five boilers at this station have been regularly inspected and are in good condition. All necessary repairs and some improvements have been made to boiler room equipment. A section of the smoke flue between the boiler room and the brick chimney, where exposed in the coal shed, was replaced on account of the corrosion of the original steel plates. The two electric lighting units at this station have received the usual attention and are in good order.

The blacksmithing, carpentry and machinists' work for all of the pumping stations has been done as usual at the Chestnut Hill shops and considerable work of this nature has also been done at these shops for the other sections of the Water Division.

At the Spot Pond Station most of the pumping has been done with the new engine, No. 17, and engines Nos. 8 and 9 have been kept in good order for emergency use. The four boilers at this station have been regularly inspected and are in good condition. The old wooden top of the ash tank was replaced with a new steel top. All necessary repairs to engines and boilers have been made at this station.

At the Arlington and Hyde Park stations the engines and boilers have been kept in good condition and the boiler settings have been repaired. At Hyde Park Station a section of the smoke flue between the boiler room and the brick chimney, where exposed to the weather, was replaced on account of the corrosion of the original steel plates.

All of the pumping station buildings have been kept in good repair and painting has been done when necessary for the proper protection of metal and wood work.

By arrangement with the city of Newton 505,672,000 gallons of water have been pumped at its Ward Street booster station for use on the high land in Watertown and Belmont where satisfactory service was not furnished from our Waban Hill Reservoir.

The engine duties at the various stations, based on plunger displacement and including the coal used in generating the steam for heating and lighting the stations, were as follows: —

Chestnut Hill Station No. 1, 126,655,000 foot pounds per 100 pounds of bituminous coal averaging 14,615 British thermal units per pound.

Chestnut Hill Station No. 2, 137,624,000 foot pounds per 100 pounds of bituminous coal averaging 14,620 British thermal units per pound.

Spot Pond Station, 110,860,000 foot pounds per 100 pounds of bituminous coal averaging 14,766 British thermal units per pound. The fires are banked for a portion of each day at this station.

Arlington Station, 78,365,000 foot pounds per 100 pounds of bituminous coal averaging 14,547 British thermal units per pound.

Hyde Park Station, 66,710,000 foot pounds per 100 pounds of mixed coal averaging 13,298 British thermal units per pound. The fires are banked for a portion of each day at this station.

DISTRIBUTION RESERVOIRS

The locations, elevations, and capacities of the distribution reservoirs of the Metropolitan Water Works are shown by the following table: —

DISTRIBUTION RESERVOIRS AND LOCATIONS	Elevation of High Water ¹	Capacity in Gallons
Low Service:		
Spot Pond, Stoneham and Medford	163.00	1,791,700,000
Chestnut Hill Reservoir, Brighton district of Boston	134.00	300,000,000
Weston Reservoir, Weston	200.00	200,000,000
Mystic Reservoir, Medford	157.00	26,200,000
Northern High Service:		
Fells Reservoir, Stoneham	271.00	41,400,000
Bear Hill Reservoir, Stoneham	300.00	2,450,000
Northern Extra High Service:		
Arlington Reservoir, steel tank, Arlington	442.50	2,000,000
Southern High Service:		
Fisher Hill Reservoir, Brookline	251.00	15,500,000
Waban Hill Reservoir, Newton	264.50	13,500,000
Forbes Hill Reservoir, Quincy	192.00	5,100,000
Forbes Hill Standpipe, Quincy	251.00	330,000
Southern Extra High Service:		
Bellevue Reservoir, steel tank, West Roxbury district of Boston	375.00	2,500,000
Total	—	2,400,680,000

¹ Elevation in feet above Boston City Base.

By arrangement with the city of Chelsea a portion of the maintenance of its reservoir on Powder Horn Hill is assumed by the Metropolitan Water Works, and the reservoir is used when necessary in connection with the northern high-service supply. This reservoir has a capacity of 1,000,000 gallons with high-water line at elevation 196.6. The reservoir was in service from January 1 to March 11 and from December 22 to the end of the year, and was kept full of water for emergency use the remainder of the time.

The Mystic Reservoir was not in service during the year but was kept full of water ready for emergency use.

All of the other distribution reservoirs were in regular service throughout the year, with the exception that the Bradlee basin of the Chestnut Hill Reservoir was out of service from October 3 to 7 on account of finding the body of Thomas J. Brucher in the water, and the Lawrence basin was out of service from January 27 to February 19, March 22 to December 13 and from December 16 to 31 on account of growths of microscopic organisms that gave the water an objectionable taste and odor which made its use undesirable. The usual care has been taken of the grounds and structures at all of the reservoirs.

The Parks Division was paid \$5,035.35 for policing at Chestnut Hill Reservoir and \$1,139.54 for policing at Spot Pond and the Fells and Bear Hill reservoirs.

Low sections of walks and grass borders along the driveways at Chestnut Hill Reservoir were raised to prevent overflow of surface water into the reservoir during heavy rains. The dome of the masonry tower at the Arlington Reservoir was waterproofed.

On account of unsatisfactory telephone service at the Spot Pond pumping station an underground fibre duct was laid from Woodland Road to the pumping station for a new telephone cable.

DISTRIBUTION PIPE LINES

The additional low-service connection made in 1926 with the city of Somerville distribution system in the Fellsway at Middlesex Avenue was put into service January 25 and the Watertown Branch of the Weston Aqueduct Supply Mains was put into regular service June 27.

The 30-inch force main from Chestnut Hill Pumping Station to the Fisher Hill Reservoir was out of service from January 1 to 7 in connection with the rebuilding of the highway bridge on Chestnut Hill Avenue over the Boston & Albany Railroad.

Two emergency connections were made between the 60-inch Weston Aqueduct Supply Main in Waltham and the city's distribution system, one at Waltham Common on February 3, the other at the pumping station near South Street on March 16. An emergency connection was installed May 27 between the Watertown Branch of the Weston Aqueduct Supply Mains and the city of Cambridge mains in River Street near Clark Road in Waltham.

One break occurred in the distribution pipe lines during the year. The 36-inch southern high-service main in Morton Street at Fairbanks Avenue, Dorchester, was broken on July 21 by the blasting operations of a contractor employed by the Boston Consolidated Gas Company. The cost of making the repairs to the Metropolitan main was \$536.02, which was borne by the contractor. No account was kept of the expense to the contractor.

During the year there were 53 leaks in the main pipe lines, which were repaired at a total cost of \$3,201.50. Of this number 13 were from defective wooden joints, which cost \$772.40 to repair. The remainder were divided as follows: 33 from lead joints in cast iron mains, 4 from calomine pipe and 3 Hydrotite joints.

The usual maintenance work has been done along the various pipe lines and at the pipe bridges.

There are now 76 Venturi meters from 6 to 60 inches in diameter in the distribution pipe lines. Sixty-four of these are on connections supplying various towns in the Metropolitan Water District, 4 on Weston Aqueduct Supply Mains, 1 each at the Hyde Park, Spot Pond and Arlington pumping stations and on emergency connections to Cambridge, Newton and Wakefield, 1 between the Fisher Hill force main and the Spot Pond main and 1 on the Clinton Road line in front of effluent gate-house No. 1 at Chestnut Hill Reservoir.

Of the 10 pressure regulating valves for reducing the pressure of water supplied to Revere, Swampscott and Winthrop and to portions of Chelsea, East Boston and Hyde Park, 7 are in regular use and have given satisfactory service and the others are kept in good order for emergency use.

Recording pressure gages have been maintained at 24 stations on the distribution system and tables in the Appendix show the hydraulic grade at 17 of these stations as determined from the charts.

Pipes, specials and other materials and supplies required for maintaining and operating the pipe lines have been kept on hand at the Glenwood pipe yard in Medford and at the Chestnut Hill pipe yard in Brighton, and an auto truck equipped with a gate-operating attachment has been stationed at each yard, with men on duty ready to operate them in case of emergency any time during the day or night. A third auto truck, equipped with gate-operating attachment, has also been maintained for relief service in case either of the other trucks is out of commission for any reason.

CONSUMPTION OF WATER

During the year 48,358,569,000 gallons of water were furnished from the Metropolitan Water Works to the 18 cities and towns supplied. This is equivalent to an average daily consumption of 132,489,200 gallons, and for the estimated population of 1,344,560 is at the rate of 98.5 gallons per capita, slightly in excess of the consumption in 1926.

The town of Brookline, with an estimated population of 44,550, was supplied from its local source, and the average daily consumption was 4,238,300 gallons, equivalent to 95 gallons per capita. The total consumption of the town was 1,546,970,000 gallons, of which 296,365,000 gallons was supplied from elevation 375 and 1,250,605,000 gallons was supplied from elevation 250.

The city of Newton, with an estimated population of 56,000, was supplied from its local source, with the exception of 683,038,000 gallons of water drawn from the Metropolitan supply through the emergency connection on Ward Street. Including this water, the average daily consumption was 4,394,100 gallons, equivalent to 78 gallons per capita.

Under special arrangements the city of Quincy supplied 26,255,000 gallons of water to the United States Government Reservation on Peddock's Island and 232,000 gallons to the town of Braintree; the town of Arlington supplied 333,000 gallons to the town of Winchester and the city of Melrose supplied 20,000 gallons to the town of Saugus.

The population, consumption of water and per cent of services metered in the Metropolitan Water District as supplied in 1927, and for the period from 1890 to 1927, inclusive, are shown graphically by the accompanying diagram.

On account of the rapid filling of the storage reservoirs during the latter portion of the year there was a noticeable increase in the color of the water supplied, which was the cause of some complaint, but from storage in the reservoirs the quality of the water is improving as a result of sedimentation and the bleaching action of the sunlight.

The average daily consumption of water in each of the municipalities in the Metropolitan Water District during 1926 and 1927, is as follows:

	Estimated Popula- tion, 1927	AVERAGE DAILY CONSUMPTION				
		1926		1927		Increase in Gallons
		Gallons	Gallons per Capita ¹	Gallons	Gallons per Capita ¹	
Arlington	26,940	1,504,400	58	1,528,000	57	23,600
Belmont	16,680	1,056,900	66	938,000	56	118,900 ²
Boston	797,870	91,275,700	116	92,751,500	116	1,475,800
Chelsea	48,460	3,474,400	72	3,441,400	71	33,000 ²
Everett	42,700	5,215,900	123	4,909,300	115	306,600 ²
Lexington	8,230	517,000	64	529,800	64	12,800
Malden	52,760	3,139,800	60	3,419,000	65	279,200
Medford	50,830	2,522,400	51	2,877,700	57	355,300
Melrose	20,960	1,379,600	67	1,342,500	64	37,100 ²
Milton	13,820	701,600	52	703,400	51	1,800
Nahant	1,700	178,200	107	170,600	100	7,600 ²
Quincy	64,380	4,757,000	76	5,001,000	78	244,000
Revere	35,000	2,263,800	66	2,377,300	68	113,500
Somerville	101,590	7,791,000	78	7,946,000	78	155,000
Stoneham	9,490	560,000	60	498,000	52	62,000 ²
Swampscott	9,230	720,800	78	688,300	75	32,500 ²
Watertown	27,000	2,059,300	78	2,256,700	84	197,400
Winthrop	16,920	1,067,000	64	1,110,700	66	43,700
District Supplied	1,344,560	130,184,800	98	132,489,200	99	2,304,400
Brookline	44,550	4,212,500	96	4,238,300	95	25,800
Newton	56,000	4,252,800	78	4,394,100	78	141,300
Total District	1,445,110	138,650,100	97	141,121,600	98	2,471,500

¹ Nearest whole number.

² Decrease.

The consumption by districts in 1927 as compared with 1926 is as follows:

	Gallons per Day 1927	INCREASE FROM 1926	
		Gallons per Day	Percent- age
Low-service district, embracing the low-service districts of Ar- lington, Belmont, Boston, Chelsea, Everett, Malden, Medford, Somerville and Watertown	72,502,400	- ¹	-
Southern high-service district, embracing Quincy, the high- service district of Boston, except East Boston, and portions of Milton and Watertown	44,725,900	- ¹	-
Southern Intermediate high-service, embracing portions of Bel- mont and Watertown	1,371,400	- ¹	-
Northern high-service district, embracing Melrose, Nahant, Revere, Stoneham, Swampscott and Winthrop and the high- service districts of Chelsea, East Boston, Everett, Malden, Medford and Somerville	11,341,400	280,200	2.53
Southern extra high-service district, embracing the higher por- tions of Hyde Park, Milton and West Roxbury	1,307,800	102,700	8.52
Northern extra high-service district, embracing Lexington and the higher portions of Arlington and Belmont	1,240,300	14,100 ²	1.12 ²
District Supplied	132,489,200	2,304,400	1.77
Brookline and Newton	8,632,400	167,100	1.97
Total District	141,121,600	2,471,500	1.78

¹ Boundary of district not the same as in 1926.

² Decrease.

Through the emergency connection on Ward Street near Hammond Street, water was furnished to the city of Newton every month in the year, the total quantity supplied being 683,038,000 gallons or 669,538,000 gallons in excess of the quantity the city is entitled to take free of charge under the agreement made in 1900, when the Waban Hill Reservoir was purchased from the city, and for this water the city will pay the sum of \$47,142.17.

WATER FROM METROPOLITAN WATER WORKS SOURCES USED OUTSIDE OF THE METROPOLITAN WATER DISTRICT

PLACES SUPPLIED	Total Quantity (Gallons)	Average Quantity (Gallons per Day)	Amount Charged
Town of Rutland	93,600,000	256,400	-
Town of Holden	22,900,000 ¹	62,700	-
Town of Clinton	35,600,000	97,500	-
Westborough State Hospital	91,810,000	252,000	2,754 30
Town of Westborough	66,000,000	180,800	-
Town of Ashland	41,975,000 ¹	115,000	-
Town of Framingham	511,043,900	1,400,100	20,441 76
Town of Natick	265,790,000	728,200	-
United States Army Reservation at Peddock's Island in Hull	26,255,000 ²	71,900	1,709 69
Portion of Town of Braintree	232,000 ³	636	-
Portion of Town of Winchester	333,000 ⁴	912	-
Portion of Town of Saugus	20,000 ⁵	55	-

Note. — Water is used throughout the year in all places except the town of Clinton, which took water on 68 days and a portion of the town of Saugus which was supplied for 65 days. The average daily use is in all cases figured on basis of 365 days.

¹ Not diverted from watersheds.

² The city of Quincy supplies the water at regular rates and turns over one-half of the receipts to the Commonwealth.

³ The city of Quincy supplies the water at regular rates and pays the Commonwealth by an addition to its regular apportionment.

⁴ The town of Arlington supplies the water at regular rates and pays the Commonwealth by an addition to its regular apportionment.

⁵ The city of Melrose supplies the water at regular rates and pays the Commonwealth by an addition to its regular apportionment.

Information regarding the installation of meters on service pipes by the municipalities supplied with water from the Metropolitan Water Works for the year 1927 and other statistics are given in tables in the Appendix.

Respectfully submitted,

BOSTON, January 2, 1928.

WILLIAM E. FOSS,
Director and Chief Engineer.

REPORT OF DIRECTOR AND CHIEF ENGINEER OF SEWERAGE DIVISION

DAVIS B. KENISTON, *Commissioner, Metropolitan District Commission.*

DEAR SIR: — The following report of the operations of the Metropolitan Sewerage Works for the year ending December 31, 1927, is respectfully submitted:

ORGANIZATION

The Director and Chief Engineer has charge of the design and construction of all new works, and of the maintenance and operation of all the works controlled by the Metropolitan District Commission for removing sewage from the twenty-seven municipalities which comprise the Metropolitan Sewerage Districts.

The following assistants have been employed during the year:

Henry T. Stiff, Associate Civil Engineer, in charge of office and drafting room and of the construction work.

Charles F. Fitz, Assistant Civil Engineer, in charge of maintenance studies and of maintenance construction work on the North Metropolitan System.

Ralph W. Loud, Assistant Civil Engineer, in charge of survey work and field work in connection with the Mill Brook Valley Sewer construction, Belmont Relief Sewer construction and New Mystic Valley Sewer construction.

Arthur F. F. Haskell, Superintendent, North Metropolitan Sewerage District.

Frank B. Williams, Superintendent, South Metropolitan Sewerage District.

In addition to the above, the maximum number of engineering and other assistants employed during the year was 11, which includes 2 instrumentmen, 2 inspectors, 1 draftsman, 4 rodmen and engineering assistants and 2 stenographers.

METROPOLITAN SEWERAGE DISTRICTS

AREAS AND POPULATIONS

During the year no changes have been made in the extent of the metropolitan sewerage districts.

The populations of the districts, as given in the following table, are based on the census of 1925.

Metropolitan Park System—December 1, 1927.

[illegible]

Table showing Ultimate Contributing Areas and Present Estimated Populations within the Metropolitan Sewerage Districts, as of December 31, 1927.

CITY OR TOWN					Area (Square Miles)	Estimated Population
North Metropolitan District	{	Arlington			5.20	27,370
		Belmont			4.66	16,990
		Boston (portions of)			3.45	105,600
		Cambridge			6.11	125,070
		Chelsea			2.24	48,720
		Everett			3.34	42,830
		Lexington ¹			5.11	5,370
		Malden			5.07	52,960
		Medford			8.35	51,520
		Melrose			3.73	21,130
		Reading			9.82	9,250
		Revere			5.86	35,380
		Somerville			3.96	102,160
		Stoneham			5.50	9,570
		Wakefield			7.65	16,240
Winchester			5.95	12,060		
Winthrop			1.61	17,100		
Woburn			12.71	18,980		
					100.32	718,300
South Metropolitan District	{	Boston (portions of)			24.96	323,030
		Brookline			6.81	44,960
		Dedham ¹			9.40	14,050
		Milton			12.59	14,020
		Newton			16.88	56,670
		Quincy			12.56	65,320
		Waltham			13.63	35,970
		Watertown			4.04	27,340
		Wellesley			9.89	9,590
		Needham			12.50	9,530
					123.26	600,480
Totals					223.58	1,318,780

¹ Part of town.

METROPOLITAN SEWERS

SEWERS PURCHASED AND CONSTRUCTED AND THEIR CONNECTIONS

During the year there has been 0.730 mile of Metropolitan sewers built within the sewerage districts, so that there are now 123.700 miles of Metropolitan sewers. Of this total, 9.642 miles of sewers, with the Quincy Pumping Station, have been purchased from cities and towns of the districts. The remaining 114.058 miles of sewers and other works have been constructed by the Metropolitan Boards.

The locations, lengths and sizes of these sewers are given in the following tables, together with other data referring to the public and special connections with the systems:

NORTH METROPOLITAN SEWERAGE SYSTEM
Location, Length and Sizes of Sewers, with Public and Special Connections

CITY OR TOWN	Size of Sewers	Length in Miles	Public Con- nec- tions, De- cem- ber 31, 1927	SPECIAL CONNECTIONS	
				Character or Location of Connection	Number in Operation
Boston: Deer Island	4' 0" to 9' 0"	1.653	4	- - -	-
East Boston	9' 0" to 1' 0"	5.467	25	Shoe factory	1
Charlestown	6' 7" x 7' 5" to 1' 0"	3.292	15	Middlebrook Wool-combing Co.	1
Winthrop	9' 0"	2.864	14	Navy Yard	9
				Private building	1
				Club House	1
				Fire department station	1
				Private building	1
				Bakery	1
				Rendering Works	1
				Metropolitan Water Works blow-off	1
Chelsea	8' 4" x 9' 2" to 15"	5.230	14	Chelsea Water Works blow-offs	2
				Naval Hospital	1
				U. S. Lighthouse Service	1
				Metropolitan Water Works blow-off	1
				Cameron Appliance Co.	1
				Shultz-Goodwin Co.	1
Everett	8' 2" x 8' 10" to 4' 8" x 5' 1"	2.925	9	Andrews-Wasgatt Co.	1
				National Metallic Bed Co.	1
				Linoide Co.	1
				Factory	2
				New England Structural Co.	1
				Beacon Oil Co.	1
Lexington ¹	1' 3"	-	1	- - -	-
Malden	4' 6" x 4' 10" to 1' 0"	5.844 ²	35	Metropolitan Water Works blow-off	1
				Private buildings	231 ³
				Private buildings	131 ⁵
Melrose	4' 6" x 4' 10" to 10"	6.099 ⁴	41	Factory	1
				Railroad station	1
				Park Department bath-house	1
				Harvard dormitories	2
				Slaughterhouse	1
Cambridge	5' 2" x 5' 9" to 1' 3"	7.879	50	City Hospital	3
				Street Railway machine shop	1
				Private building	1
				Factory building	1
				Tannery	1
				Slaughterhouses (3)	1
				Carhouse	1
				Somerville Water Works blow-off	1
Somerville	6' 5" x 7' 2" to 10"	3.577	15	Street railway power house	1
				Stable	1
				Rendering works	1
				Railroad scale pit	1
				Private building	1

¹ The Metropolitan Sewer extends but a few feet into the town of Lexington.
² Includes 1.84 miles of sewer purchased from the city of Malden.
³ Mostly buildings connected with sewers formerly belonging to city of Malden but later purchased by the Metropolitan Sewerage Commission in accordance with Chapter 215 of the Acts of 1898 and by the Metropolitan Water and Sewerage Board in accordance with Chapter 512 of the Acts of 1911 and made parts of the North Metropolitan Sewerage System.
⁴ Includes 0.736 of a mile of sewer purchased from the city of Melrose.
⁵ Mostly buildings connected with a sewer formerly belonging to the city of Melrose but later purchased by the Metropolitan Sewerage Commission in accordance with Chapter 414 of the Acts of 1896 and with a sewer extension built in accordance with Chapter 436 of the Acts of 1897 by the Metropolitan Sewerage Commission as an outlet for part of the town of Stoneham and made parts of the North Metropolitan Sewerage System.

NORTH METROPOLITAN SEWERAGE SYSTEM — *Concluded*

Location, Length and Sizes of Sewers, with Public and Special Connections — Con.

CITY OR TOWN	Size of Sewers	Length in Miles	Public Con- nections, Decem- ber 31, 1927	SPECIAL CONNECTIONS	
				Character or Location of Connection	Number in Operation
Medford	4' 8" x 5' 1" to 10"	6.326	26	Armory building . Private buildings . Stable . Police substation . Tanneries . Private buildings . Gelatine factory . Watch-hand factory . Stable . Railroad station . Felt works . Town Hall . Bay State Saw & Tool Co. . Whitney Machine Co. . Metropolitan Sewerage Divi- sion .	1 9 1 1 6 12 1 1 1 2 1 1 1 1 1 1
Winchester	4' 6" to 1' 3"	10.420	32	Glue factory . Private building . Private buildings . Railroad station . Car house . Post office . Town of Arlington garage . The Theodore Schwamb Co., Inc. . Arlington Gas Light Co. .	4 1 215 ² 1 3 1 1 1 1
Stoneham	1' 8" to 10"	2.333	6	-	-
Woburn	2' 6" x 2' 7" to 1' 3"	1.186	3	-	-
Arlington	3' 0" x 3' 6" to 10"	5.346 ¹	61	-	-
Belmont	1' 3" to 2' 6"	0.008	5	-	-
Wakefield	3' 0" to 2' 0" x 2' 3"	0.703	1	-	-
Revere	4' 0" to 15"	0.136	3	-	-
Reading	1' 4" to 3' 0"	0.055	1	-	-
		71.843 ³	361		684

¹ Includes 2.631 miles of sewer purchased from the town of Arlington.

² Mostly buildings connected with a sewer formerly belonging to the town of Arlington but later purchased by the Metropolitan Sewerage Commission in accordance with Chapter 520 of the Acts of 1897 and made a part of the North Metropolitan Sewerage System.

³ Includes 2.787 miles of Mystic Valley Sewer in Medford and Winchester, running parallel with the Metropolitan Sewer.

SOUTH METROPOLITAN SEWERAGE SYSTEM

Location, Length and Sizes of Sewers, with Public and Special Connections

CITY OR TOWN	Size of Sewers	Length in Miles	Public Con- nections, Decem- ber 31, 1927	SPECIAL CONNECTIONS	
				Character or Location of Connection	Number in Operation
Boston: Back Bay	6' 6" to 3' 9"	1.500 ¹	16	Tufts Medical School . Private house . Administration Building, Bos- ton Park Department . Simmons College Buildings . Art Museum . Prince District Elementary School . Private building . Abbatoir .	1 1 1 1 2 1 1 1 3
Brighton	5' 9" x 6' 0" to 12"	6.010 ²	15		

¹ Includes 0.355 of a mile of sewer purchased from the city of Boston.

² Includes 0.446 of a mile of pipe and concrete sewers built for the use of the city of Boston; also 0.026 of a mile of sewer purchased from the town of Watertown.

SOUTH METROPOLITAN SEWERAGE SYSTEM — *Concluded*
Location, Length and Sizes of Sewers, with Public and Special Connections — Con.

CITY OR TOWN	Size of Sewers	Length in Miles	Public Con- nec- tions, Decem- ber 31, 1927	SPECIAL CONNECTIONS	
				Character or Location of Connection	Number in Operation
Dorchester	3' x 4' to 2' 6'' x 2' 7''	2.870 ¹	14	Chocolate works Machine shop Paper Mill Private buildings Edison Electric Company Sta- tion Mattapan Paper Mills	2 1 1 3 1 2
Hyde Park	10' 7'' x 11' 7'' to 4' 0'' x 4' 1''	4.527	19	Private buildings Fairview Cemetery buildings	2 1
Roxbury	6' 6'' x 7' to 4' 0''	1.430	—	—	—
West Roxbury	9' 3'' x 10' 2'' to 12''	7.643	20	Caledonia Grove buildings Parental School Lutheran Evangelical Church Private buildings	1 1 1 6
Brookline	6' 6'' x 7' 0'' to 8''	2.540 ²	14	Private buildings	2
Dedham	4' x 4' 1'' to 2' 9'' x 3'	5.012	8	Private buildings Dedham Carpet Mills	2 1
Hull ³	60'' pipe	0.750	—	—	—
Milton	11' x 12' to 8''	3.600	29	Private buildings	3
Newton	4' 2'' x 4' 9'' to 1' 3''	2.911	10	Private houses Laundry Metropolitan Water Works blow-off Squantum schoolhouse	13 1 1 1
Quincy	11' 3'' x 12' 6'' to 24'' pipe	7.392	22	—	—
Waltham	3' 6'' x 4' 0''	0.001	1	Private building Factories Stanley Motor Carriage Co. Knights of Pythias building Walker-Gordon Co. Private building	1 2 1 1 1 1
Watertown	4' 2'' x 4' 9'' to 12''	0.750 ⁴	8	—	—
Needham	2' 0'' x 2' 3'' to 2' 3'' x 2' 6''	4.921	1	—	—
Wellesley ⁵	2' 0'' x 2' 3''	—	1	—	—
		51.857	178		64

¹ Includes 1.24 miles of sewer purchased from the city of Boston.
² Includes 0.158 of a mile of pipe sewer built for the use of the town of Brookline.
³ Hull is not a part of the Metropolitan Sewerage District.
⁴ Includes 0.025 of a mile of sewer purchased from the town of Watertown.
⁵ The Metropolitan Sewer extends but a few feet into the town of Wellesley.

Information relating to areas, populations, local sewer connections and other data for the Metropolitan sewerage districts appears in the following table:

North Metropolitan Sewerage District

Area (Square Miles)	Estimated Total Population	Miles of Local Sewer Connected	Estimated Population Contributing Sewage	Ratio of Contributing Population to Total Population (Per Cent)	CONNECTIONS MADE WITH METROPOLITAN SEWERS	
					Public	Special
100.32	718,300	899.51	667,190	92.9	361	684

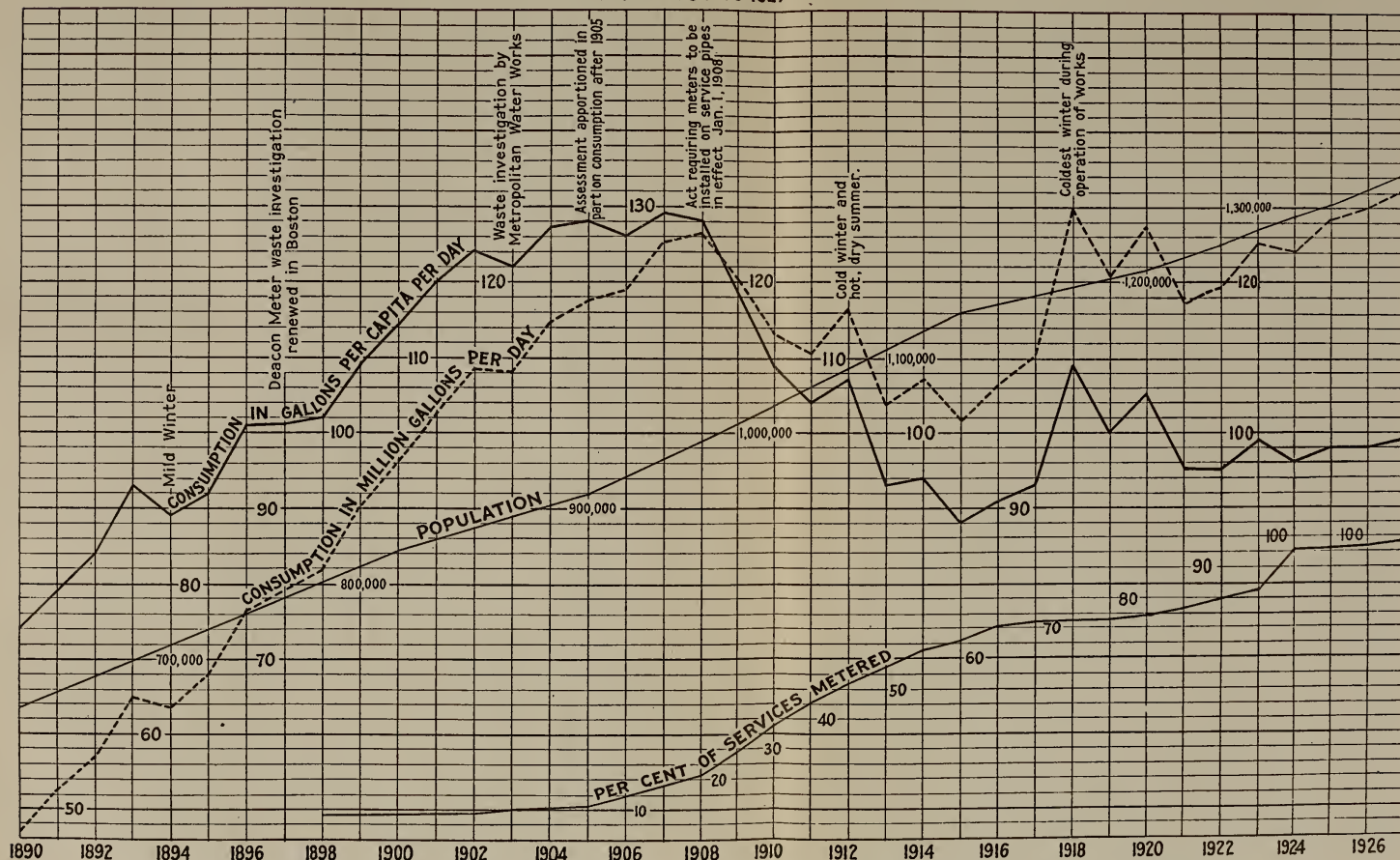
South Metropolitan Sewerage District

123.26	600,480	823.46	475,430	79.2	178	64
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Both Metropolitan Sewerage Districts

223.58	1,318,780	1,722.97	1,142,620	86.6	539	748
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POPULATION, CONSUMPTION OF WATER AND PER CENT OF SERVICES METERED
IN THE
METROPOLITAN WATER DISTRICT
AS SUPPLIED IN 1927
FROM 1890 TO 1927



Note: Estimated population and consumption per capita given on diagram published in annual reports 1916 to 1924 inclusive have been revised and are here shown in accordance with 1925 census.

Of the estimated gross population of 1,318,780 on December 31, 1927, 1,142,620, representing 86.6 per cent, were on that date contributing sewage to the Metropolitan sewers, through a total length of 1,722.97 miles of local sewers owned by the individual cities and towns of the districts.

These sewers are connected with the Metropolitan Systems by 539 public and 748 special connections. During the current year there has been an increase of 53.02 miles of local sewers connected with the Metropolitan Systems, and 17 public and 33 special connections have been added.

CONSTRUCTION

NORTH METROPOLITAN SEWERAGE SYSTEM

MILL BROOK VALLEY SEWER — ARLINGTON

The construction work authorized by Chapter 116 of the Acts of 1924 in the Mill Brook Valley, Arlington, North Metropolitan Sewerage System, described in former reports, has been completed and the sewers are now in operation.

BELMONT RELIEF SEWER — SECTION 81

Chapter 213 of the Acts of 1926 authorized the construction of an additional¹ main sewer from the Belmont line to the Alewife Brook Valley Sewer of the North Metropolitan Sewerage System in Cambridge. This work is known as Section 81, Belmont Relief Sewer of the North Metropolitan Sewerage System. Surveys were made and a contract let for the construction of the same, as described in last year's report. Work was started on this section March 11, 1927, and was carried on to completion and the line was put in operation November 15, 1927. This work extends wholly in lands of the Boston and Maine Railroad. Considerable ground water was encountered. A pile foundation extends from Station 18+04 to Station 25+92.

MALDEN, REVERE AND EVERETT DRAINAGE SYSTEM

Chapter 456 of the Acts of 1924 directed the Metropolitan District Commission to construct a drainage channel to improve a low area lying in the cities of Malden, Revere and Everett. Surveys and land takings were completed and work was started on construction plans and field work on July 12, 1926. A temporary injunction by the Supreme Court was placed on the further carrying on of this work which ceased for the present on July 28, 1926, pending the decision of the Court on the question before it.

The Court has not yet rendered a decision.

NEW MYSTIC VALLEY SEWER

Chapter 184 of the Acts of 1927 authorized an extension of the New Mystic Valley main sewer, North Metropolitan Sewerage System, from its present terminus near Grove Street in Medford to Prescott Street in Medford. Surveys for this work have been completed and contract plans are nearly ready. Construction work will start early in 1928.

MAINTENANCE

SCOPE OF WORK AND FORCE EMPLOYED

The maintenance of the Metropolitan Sewerage System includes the operation of 8 pumping stations, the Nut Island screen-house and 123.700 miles of Metropolitan sewers, receiving the discharge from 1,722.97 miles of town and city sewers at 539 points, together with the care and study of inverted siphons under streams and in the harbor.

At present the permanent maintenance force consists of 174 men, of whom 108 are employed on the North System and 66 on the South System. These are sub-

divided as follows: North Metropolitan System, 67 engineers and other employees in the pumping stations and 41 men, including foremen, on maintenance, care of sewer lines, buildings and grounds; South Metropolitan System, 41 engineers and other employees in the pumping stations and 25 men, including foremen, on maintenance, care of sewer lines, buildings and grounds.

The regular work of this department, in addition to the operation of the pumping stations, has consisted of routine work of cleaning and inspecting sewers and siphons, caring for tide gates, outfall sewers, regulators and overflows, measuring flow in sewers, inspection of connections to the Metropolitan sewers, and the care of pumping stations and other buildings, grounds and wharves.

In addition to these regular duties, other work has been done by the maintenance employees in this department as follows:

EAST BOSTON PUMPING STATION

The original cast-iron salt-water injection pipe for engines numbered 1, 2 and 3 in this station was placed in 1894. This had become so badly corroded that it was necessary to replace it entirely. This was done by means of an 8-inch cast-iron pipe which was placed in the gallery underneath the main floor.

The low pressure cylinder on Engine No. 2 was overhauled and new metallic gaskets and rings were installed.

The grease well at the East Boston end of the Chelsea River siphon was cleaned and a new diaphragm was put in place.

DEER ISLAND PUMPING STATION

The copper on the roofs at the Deer Island Pumping Station, coal pockets and screen-house had become so badly corroded that it was necessary to make an entire renewal. This was done with 24-ounce copper. The work included renewal of gutters, crickets, flashings, down-spouts, cupola covering, valleys and ridges.

The allowable pressure in the two 60-inch horizontal tubular boilers installed in 1899 at this station had been reduced by the Boiler Inspection Department to such an extent that the boilers were no longer capable of operating the station. These were removed and two new 72-inch boilers of horizontal type were furnished and installed by the D. M. Dillon Steam Boiler Works of Fitchburg.

The bridge leading from the Metropolitan Sewerage wharf to the Deer Island shore was constructed in 1892. The coal run which rested on this bridge was constructed in 1895. These had become so badly rotted that it was necessary to replace them with new work. This was done by the William L. Miller Company who furnished the labor. Material was furnished by the Commission.

CHARLESTOWN PUMPING STATION

The allowable pressure in the horizontal tubular boilers numbered 1 and 2, originally installed in 1894, was so reduced by the Boiler Inspection Department that the boilers could no longer operate the station. These were removed and two new boilers similar in type and size, built by the International Engineering Works of Framingham, were installed in their place.

The Sturtevant economizer at this station had become so badly corroded that it was necessary to make a replacement. This was done by a Green economizer of similar type and capacity.

ALEWIFE BROOK PUMPING STATION

A new Reilly feed water heater was installed at this station.

No. 2 boiler in this station was retubed throughout.

One of the original 4,000,000 gallon pumping units at this station has been replaced by a Morris centrifugal pump and cross-compound vertical engine. The capacity of the new unit is 8,000,000 gallons per day.

NUT ISLAND SCREEN-HOUSE

In addition to the regular maintenance work at the Nut Island Screen-house and at the Hough's Neck Pumping Station, the employees of this station have made 5,508 lbs. of brass castings for the different pumping stations of the Sewerage System. A large amount of expert machine work has been done here for other stations.

GASOLENE IN PUBLIC SEWERS

During the year the usual precautions have been maintained against the introduction of gasoline into the Metropolitan sewers. An inspector who covers both North and South Metropolitan Sewerage Districts has been employed. His duties are to see that all newly constructed garages or other gasoline using establishments are supplied with a proper gasoline separator and also to see that these separators are kept in working condition.

During the year 1927 the number of permits issued by the municipalities in the Sewerage Districts for the construction of garages and other places where gasoline is used was 840. Each of these permits necessitates an examination by our inspector. Many of them are attended to through the mails and do not require a personal visit. Visits are made, however, to all locations where a connection is to be made with the public sewerage system and to such places as do not respond to the return postal cards sent out. During the year 42 such places were connected with the sewers that empty into the Metropolitan Systems. At the present time, there are, according to our records, 1,470 garages and other establishments where gasoline is used connected with the local sewerage systems which discharge into the Metropolitan sewers.

This system of inspection has improved the gasoline situation in regard to the danger to the sewers. Occasionally odors of gasoline are detected in the sewers. These are reported to the Public Safety Department which alone has statutory control of the distribution and handling of gasoline in the Commonwealth.

NORTH METROPOLITAN SEWERAGE SYSTEM

Table showing Cities and Towns delivering Sewage to this System; Approximate Miles of Sewers connected; Estimated Populations and Areas now contributing; Total Areas ultimately to contribute, and Present Population on Such Areas; Ratios of Present Contributing Areas to Ultimate Areas, and Ratios of Populations now contributing to Present Total Populations.

[Populations estimated as of December 31, 1927]

CITIES AND TOWNS	Miles of Local Sewers Connected	Separate or Combined	Number of Connections with Local Sewers	Estimated Number of Persons Served by Each House Connection ¹	Estimated Population Now Contributing Sewage	Estimated Present Total Population	Estimated Area Now Contributing Sewage	Area Ultimately to Contribute to Sewage	Ratio of Contributing Population to Present Total Population	Ratio of Contributing Area to Ultimate Area
							Sq. Miles	Sq. Miles	Per Cent.	Per Cent.
Boston (Deer Island)	0.70	Separate . . .	3,617	4.7	820 ²	820	1.40	1.61	99.4	87.0
Winthrop . . .	33.10	Separate . . .	5,398	11.8	17,000	17,100	1.20	2.18	96.2	55.0
Boston (East Boston)	34.58	Separate and combined	4,691	10.2	63,700	66,230	1.19	2.24	98.2	53.1
Chelsea . . .	32.33	Separate and combined	6,235	6.7	41,750	48,720	2.12	3.34	97.5	63.5
Everett . . .	52.27	Separate and combined	8,816	5.75	50,690	52,960	3.32	5.07	95.7	65.5
Malden . . .	73.94	Separate . . .	4,402	4.45	19,590	21,130	2.11	3.73	92.7	56.6
Melrose . . .	45.73	Separate . . .	5,558	6.85	38,070	38,550	0.67	1.27	98.8	52.8
Boston (Charlestown)	21.80	Separate and combined	18,450	6.75	124,540	125,070	5.11	6.11	99.6	83.6
Cambridge . . .	163.05	Separate and combined	17,569	5.75	101,020	102,160	3.64	3.96	98.9	91.9
Somerville . . .	105.95	Separate and combined	8,871	5.7	50,560	51,520	3.79	8.35	98.1	45.4
Medford . . .	79.84	Separate . . .	2,477	4.8	11,890	12,060	1.87	5.95	98.6	31.4
Winchester . . .	39.05	Separate . . .	1,595	5.5	8,770	18,980	1.10	12.71	46.2	8.7
Woburn . . .	19.97	Separate . . .	1,237	4.8	5,940	9,570	0.84	5.50	62.1	15.3
Stoneham . . .	15.67	Separate . . .	4,712	5.1	24,030	27,370	2.43	5.20	87.8	46.7
Arlington . . .	47.66	Separate . . .	2,614	5.8	15,780 ³	16,990	1.83	4.66	92.9	39.3
Belmont . . .	38.89	Separate . . .	1,356	5.2	7,050	16,240	0.93	7.65	43.4	12.2
Wakefield . . .	22.05	Separate . . .	425	4.1	1,740	5,370	0.51	5.11	32.4	10.0
Lexington . . .	11.95	Separate . . .	4,898	6.9	33,800	35,380	2.44	5.86	95.5	41.6
Revere . . .	51.00	Separate . . .	629	4.1	2,580	9,250	0.47	9.82	27.9	4.8
Reading . . .	9.98	Separate . . .								
Totals . . .	899.51	- - -	103,550	6.4	667,190	718,300	36.97	100.32	92.9	36.9

¹ Estimated from Assessors' statement of the number of houses in each city or town on April 1, 1927, and the population from census of 1925.
² Estimated by Superintendent of the Institution on Deer Island.
³ Including 2 connections with McLean Hospital, having an estimated population of 614.

SOUTH METROPOLITAN SEWERAGE SYSTEM

Table showing Cities and Towns delivering Sewage to this System; Approximate Miles of Sewers connected; Estimated Populations and Areas now contributing; Total Areas ultimately to contribute, and Present Populations on Such Areas; Ratios of Present Contributing Areas to Ultimate Areas, and Ratios of Populations now contributing to Present Total Populations.

[Populations estimated as of December 31, 1927]

CITIES AND TOWNS	Miles of Local Sewers Connected	Separate or Combined	Number of Connections with Local Sewers	Estimated Number of Persons Served by Each House Connection ¹	Estimated Population Now Contributing Sewage	Estimated Present Total Population	Estimated Area Now Contributing Sewage	Area Ultimately to Contribute to Sewage	Ratio of Contributing Population to Present Total Population	Ratio of Contributing Area to Ultimate Area
Boston (Back Bay)	27.61	Separate and combined	2,161	19.7	42,570	42,770	Sq. Miles 1.16	Sq. Miles 1.61	Per Cent. 99.5	Per Cent. 72.0
Boston (Brighton)	70.09	Separate and combined	5,475	9.9	54,200	54,600	3.32	3.74	99.3	88.8
Brookline	80.62	Separate and combined	6,407	6.95	44,530	44,960	3.78	6.81	99.0	55.5
Newton	160.09	Separate	10,902	5.1	55,600	56,670	8.73	16.88	98.1	51.7
Watertown	57.72	Separate	4,882	5.5	26,850	27,340	2.58	4.04	98.2	63.9
Waltham	51.46	Separate	4,690	7.5	35,180	35,970	2.62	13.63	97.8	19.2
Boston (Dorchester)	67.59	Separate and combined	7,681	9.3	71,430 ²	99,500 ²	2.85	4.89	71.8	58.3
Milton	24.81	Separate and combined	1,860	4.3	8,000 ²	14,020 ²	1.19	12.59	57.1	9.5
Boston (Hyde Park)	39.28	Separate	3,032	6.8	20,620	20,810	1.80	4.57	99.1	39.4
Dedham	20.49	Separate	1,228	5.3	6,510	14,050 ³	1.00	9.40	46.3	10.6
Boston (Roxbury) ⁴	—	—	—	—	—	49,850 ²	—	1.23	—	—
Boston (West Roxbury)	75.74	Separate and combined	6,165	6.3	41,440 ^{2,5}	55,500 ²	3.19	8.92	74.7	35.8
Quincy	113.07	Separate	10,702	5.95	63,680	65,320	4.45	12.56	97.5	35.4
Wellesley	28.89	Separate	1,010	4.2	4,240	9,590	1.63	9.89	44.2	16.5
Needham	6.00	Separate	136	4.3	580	9,530	0.30	12.50	6.1	2.4
Totals	823.46	—	66,331	7.2	475,430	600,480	38.60	123.26	79.2	31.3

¹ Estimated from Assessors' statement of the number of houses in each city or town on April 1, 1927, and the population from census of 1925.

² Parts of Dorchester, Milton, Roxbury and West Roxbury which are situated within the South Metropolitan Sewerage System limits are tributary at present to Boston main drainage works.

³ Part of town not included in Metropolitan Sewerage District.

⁴ At present connected with Boston main drainage system.

⁵ Including connection with institutions at Austin Farm, having an estimated population of 2,605.

BOTH METROPOLITAN SEWERAGE SYSTEMS

Table showing Areas delivering Sewage to both Systems; Approximate Miles of Sewers connected; Estimated Populations and Areas now contributing; Total Areas ultimately to contribute, and Present Populations on Such Areas. Ratios of Present Contributing Areas to Ultimate Areas, and Ratios of Populations now contributing to Present Total Populations.

[Population estimated as of December 31, 1927]

SYSTEMS	Miles of Local Sewers Connected	Separate or Combined	Number of Connections with Local Sewers	Estimated Number of Persons Served by Each House Connection	Estimated Population Now Contributing Sewage	Estimated Present Total Population	Estimated Area Now Contributing Sewage	Area Ultimately to Contribute to Sewage	Ratio of Contributing Population to Present Total Population	Ratio of Contributing Area to Ultimate Area
North Metropolitan .	899.51	Separate and combined	103,550	6.4	667,190	718,300	Sq. Miles 36.97	Sq. Miles 100.32	Per Cent. 92.9	Per Cent. 36.9
South Metropolitan .	823.46	Separate and combined	66,331	7.2	475,430	600,480	38.60	123.26	79.2	31.3
Totals . . .	1,722.97	- - -	169,881	6.7	1,142,620	1,318,780	75.57	223.58	86.6	33.8

PUMPING STATIONS

Capacities and Results

NORTH METROPOLITAN SYSTEM

Deer Island Pumping Station

At this station are four submerged centrifugal pumps with impeller wheels 8.25 feet in diameter, driven by triple-expansion engines of the Reynolds-Corliss type.

Contract capacity of 1 pump: 100,000,000 gallons, with 19-foot lift.

Contract capacity of 3 pumps: 45,000,000 gallons each, with 19-foot lift.

Average coal duty for the year: 55,000,000 foot pounds.

Average quantity raised each day: 84,000,000 gallons.

Maximum quantity raised per day: 150,700,000 gallons.

East Boston Pumping Station

At this station are four submerged centrifugal pumps, with impeller wheels 8.25 feet in diameter, driven by triple-expansion engines of the Reynolds-Corliss type.

Contract capacity of 1 pump: 100,000,000 gallons with 19-foot lift.

Contract capacity of 3 pumps: 45,000,000 gallons each, with 19-foot lift.

Average coal duty for the year: 76,800,000 foot pounds.

Average quantity raised each day: 82,000,000 gallons.

Maximum quantity raised per day: 148,700,000 gallons.

Charlestown Pumping Station

At this station are three submerged centrifugal pumps, two of them having impeller wheels 7.5 feet in diameter, the other 8.25 feet in diameter. They are driven by triple-expansion engines of the Reynolds-Corliss type.

Contract capacity of 1 pump: 60,000,000 gallons with 8-foot lift.

Contract capacity of 2 pumps: 22,000,000 gallons each, with 11-foot lift.

Average coal duty for the year: 50,800,000 foot pounds.

Average quantity raised each day: 46,700,000 gallons.

Maximum quantity raised per day: 69,400,000 gallons.

Alewife Brook Pumping Station

One of the 9-inch Andrews centrifugal pumps was removed during the year and a Morris pump and engine was put in its place.

The pumping units in this station now consist of one Andrews pump driven by a compound marine engine, one Morris pump and Morris compound engine and a specially designed engine of vertical cross-compound type having between the cylinders a centrifugal pump rotating on a horizontal axis.

Contract capacity of the Andrews pump: 4,500,000 gallons with 13-foot lift.

Contract capacity of Morris pump: 8,000,000 gallons with 15-foot lift.

Contract capacity of the special pump: 13,000,000 gallons with 13-foot lift.

Average coal duty for the year: 23,100,000 foot pounds.

Average quantity raised each day: 5,800,000 gallons.

Maximum quantity raised per day: 11,410,000 gallons.

Reading Pumping Station

At this station are two submerged centrifugal pumps, one of 2,500,000 gallons per 24 hours, and one of 4,000,000 gallons per 24 hours, capacity. These operate against a maximum head of 65 feet, and are actuated by vertical shafts directly

connected with 75 and 100 horsepower motors. Alternating current of 440 volts furnished by the town of Reading is used.

Average quantity pumped per 24 hours: 833,000 gallons.

Maximum quantity raised per day: 1,000,000 gallons.

SOUTH METROPOLITAN SYSTEM.

Ward Street Pumping Station

At this station are two vertical, triple-expansion pumping engines, of the Allis-Chalmers type, operating reciprocating pumps, the plungers of which are 48 inches in diameter with a 60-inch stroke and one 50,000,000-gallon centrifugal pumping unit actuated by a 500 H.P. Uniflow engine.

Contract capacity of 3 pumps: 50,000,000 gallons each, with 45-foot lift.

Average coal duty for the year: 78,300,000 foot pounds.

Average quantity raised each day: 37,300,000 gallons.

Maximum quantity raised per day: 57,220,000 gallons.

Quincy Pumping Station

The plant at this station consists of one compound condensing Deane duplex piston pumping unit and one Lawrence centrifugal pump driven by a Sturtevant compound condensing engine and one Morris centrifugal pump driven by a Morris compound condensing engine.

Contract capacity of 3 pumps: Morris centrifugal, 10,000,000 gallons; Deane, 5,000,000 gallons; Lawrence centrifugal, 10,000,000 gallons.

Average coal duty for the year: 33,800,000 foot pounds.

Average quantity raised each day: 7,245,000 gallons.

Maximum quantity raised per day: 18,800,000 gallons.

Nut Island Screen-house

The plant at this house includes two sets of screens in duplicate actuated by small reversing engines of the Fitchburg type. Two vertical Deane boilers, 80 horsepower each, operate the engines, provide heat and light for the house, burn materials intercepted at the screens, and furnish power for the Hough's Neck pumping station.

Average daily quantity of sewage passing screens: 68,200,000 gallons.

Maximum quantity passing screens per day: 162,000,000 gallons.

Hough's Neck Pumping Station

At this station are two 6-inch submerged Lawrence centrifugal pumps with vertical shafts actuated by two Sturtevant direct-current motors.

The labor and electric energy for this station are supplied from the Nut Island Screen-house, and as used at present it does not materially increase the amount of coal used at the latter station.

Average quantity raised each day: 283,000 gallons.

Maximum quantity raised per day: 483,300 gallons.

Average Daily Volume of Sewage lifted at Each of the Eight Metropolitan Sewerage Pumping Stations during the Year, as compared with the Corresponding Volumes for the Previous Year.

PUMPING STATION	AVERAGE DAILY PUMPAGE			
	Jan. 1, 1927, to Dec. 31, 1927	Jan. 1, 1926, to Dec. 31, 1926	Increase during the Year	
	Gallons	Gallons	Gallons	Per Cent
Deer Island	84,000,000	79,300,000	4,700,000	5.9
East Boston	82,000,000	77,300,000	4,700,000	6.1
Charlestown	46,700,000	43,500,000	3,200,000	7.4
Alewife Brook	5,800,000	5,800,000	—	—
Reading	833,000	833,000	—	—
Quincy	7,245,000	6,238,000	1,007,000	16.1
Ward Street (actual gallons pumped)	37,300,000	36,200,000	1,100,000	3.0
Hough's Neck	283,000	245,000	38,000	15.5

METROPOLITAN SEWERAGE OUTFALLS

The Metropolitan Sewerage Districts now have outfalls in Boston Harbor at five points, two of which may discharge sewage from the North District and three from the South District.

During the year the sewage of the North District has been discharged wholly through the outlet located near Deer Island light. The other outfall of this system is closed by a cast-iron cover which can easily be removed.

Of the outfalls of the South District two extend for a distance exceeding one mile from the shore of Nut Island, Quincy, and the third one, called an emergency outlet, extends about 1,500 feet from the same. It was necessary to discharge sewage through this outfall fourteen hours during the year.

During the year the average flow through the North Metropolitan District outfall at Deer Island has been 84,000,000 gallons of sewage per 24 hours, with a maximum rate of 150,700,000 gallons during a stormy period in December, 1927. The amount of sewage discharged into the North Metropolitan District averaged 126 gallons per day for each person, taking the estimated population of the District contributing sewage. If the sewers in this District were restricted to the admission of sewage proper only, this per capita amount would be considerably decreased.

In the South Metropolitan District an average of 68,200,000 gallons of sewage per 24 hours has passed through the screens at the Nut Island screen-house and has been discharged from the outfalls into the outer harbor. The maximum rate of discharge per day which occurred during a stormy period in November, 1927, was 162,000,000 gallons. The discharge of sewage through these outfalls represents the amount of sewage contributed by the South Metropolitan District, which was at the rate of 143 gallons per day per person of the estimated number contributing sewage in the District.

The daily discharge of sewage per capita is considerably larger in the South Metropolitan District than it is in the North Metropolitan District, because owing to the large size and unused capacity of the South District High-level Sewer, more storm water is at present admitted to the sewers of this District.

Material Intercepted at the Screens

The material removed from the sewage at the screens of the North Metropolitan Sewerage Stations, consisting of rags, paper and other floating materials, has during the year amounted to 1,933 cubic yards. This is equivalent to 1.70 cubic feet for each million gallons of sewage pumped at Deer Island.

The material removed from the sewage at the screens of the South Metropolitan Sewerage Stations amounted to 4,367 cubic yards, equal to 4.74 cubic feet per million gallons of sewage delivered at the outfall works at Nut Island.

Studies of sewage flows in the Metropolitan sewers and siphons indicate that they are free from deposit.

FREDERICK D. SMITH,
Director and Chief Engineer of Sewerage Division.

BOSTON, January 1, 1928.

FINANCIAL STATEMENT
OF THE
METROPOLITAN DISTRICT COMMISSION

FOR THE YEAR ENDING NOVEMBER 30, 1927

PARKS DIVISION
Construction

METROPOLITAN PARKS CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1926	\$9,093,043 96
Receipts added before June 1, 1901	198,942 81
	<u>\$9,291,986 77</u>

Expenditures

Middlesex Fells Reservation:	
Land	\$100 00
Legal:	
Services	\$21 43
Expenses	4 47
	<u>25 90</u>
Amounts charged to Dec. 1, 1926	\$125 90 9,263,478 03
	<u>9,263,603 93</u>
Balance, Dec. 1, 1927	\$28,382 84

METROPOLITAN PARKS CONSTRUCTION FUND, SERIES II

Total amount authorized to Dec. 1, 1926	\$9,417,749 63
Receipts from sales, etc.	29,934 16
	<u>\$9,447,683 79</u>

Expenditures

Quannapowitt Parkway:	
Construction:	
Contract, Greenough Const. Co.	\$4,000 00
Land	2,176 40
Legal:	
Services	\$22 87
Expenses	5 62
	<u>28 49</u>
	\$6,204 89
Middlesex Fells Parkway:	
Construction:	
Contract, Coleman Bros.	15,494 22
Neponset Bridge:	
Engineering:	
Expenses	275 47
	<u>\$21,974 58</u>
Amounts charged to Dec. 1, 1926	9,374,641 93
	<u>9,396,616 51</u>
Balance, Dec. 1, 1927	\$51,067 28

CHARLES RIVER BASIN CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1926	\$4,500,000 00
Receipts to Dec. 1, 1926	9,368 91
	<u>\$4,509,368 91</u>

Expenditures

Bond book	\$60 00
Amounts charged to Dec. 1, 1926	4,472,862 22
	<u>4,472,922 22</u>
Balance, Dec. 1, 1927	\$36,446 69

NANTASKET BEACH CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1926	\$700,000 00
Receipts to Dec. 1, 1926	5,881 50
	<u>\$705,881 50</u>

Expenditures

Amounts charged to Dec. 1, 1926	\$705,881 50
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NORTH BEACON STREET BRIDGE CONSTRUCTION FUND			
Total amount authorized to Dec. 1, 1926	.	.	\$175,000 00
Expenditures			
Transfer to Serial Bond Loan	.	.	\$146 50
Amounts charged to Dec. 1, 1926	.	.	174,853 50
			\$175,000 00

MASSACHUSETTS AVENUE BRIDGE CONSTRUCTION FUND			
Total amount authorized to Dec. 1, 1926	.	.	\$600,000 00
Expenditures			
Interest	.	.	\$0 69
Amounts charged to Dec. 1, 1926	.	.	522,296 56
			522,297 25
Balance, Dec. 1, 1927	.	.	\$77,702 75

NORTHERN TRAFFIC ROUTE CONSTRUCTION FUND			
Total amount authorized to Dec. 1, 1926	.	.	\$2,400,000 00
Chap. 315, Acts of 1927	.	.	550,000 00
			\$2,950,000 00

Expenditures			
Construction:			
Contracts:			
Bay State Dredging & Cont. Co.	.	\$24,242 70	
Coleman Bros.	.	339,363 13	
James H. Fannon	.	76,779 42	
			\$440,385 25
Labor and materials	.		25,776 32
			\$466,161 57
Land	.		56,401 80
Engineering:			
Services	.	\$24,329 46	
Supplies and expenses	.	888 55	
			25,218 01
Legal:			
Services	.	\$1,692 31	
Expenses	.	74 29	
			1,766 60
Claims	.		1,425 50
Advertising bids	.		42 95
Printing contracts, etc.	.		144 72
			\$551,161 15
Amounts charged to Dec. 1, 1926	.	.	1,785,336 61
			2,336,497 76
Balance, Dec. 1, 1927	.	.	\$613,502 24

BROOKLINE STREET, ESSEX STREET, COTTAGE FARM BRIDGE CONSTRUCTION FUND			
Total amount authorized to Dec. 1, 1926	.	.	\$1,300,000 00
Chap. 320, Acts of 1927	.	.	250,000 00
			\$1,550,000 00

Expenditures			
Construction:			
Contracts:			
T. Stuart & Sons Co.	.	\$785,341 19	
J. F. White Cont. Co.	.	4,832 86	
			\$790,174 05
Labor and materials	.		29,066 17
			\$819,240 22
Engineering:			
Services	.	\$16,595 04	
Supplies and expenses	.	7,438 09	
			24,033 13
Legal:			
Services	.	\$18 21	
Expenses	.	10 00	
			28 21
Claims	.		250 00
Interest	.		5,521 84
			\$849,073 40
Amounts charged to Dec. 1, 1926	.	.	163,837 49
			1,012,910 89
Balance, Dec. 1, 1927	.	.	\$437,089 11

WESTERN AVENUE, ARSENAL STREET BRIDGE CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1926	\$200,000 00	
<i>Expenditures</i>		
Engineering:		
Supplies and expenses	\$209 69	
Interest	17	
	<hr/>	
	\$209 86	
Amounts charged to Dec. 1, 1926	192,760 94	192,970 80
	<hr/>	
Balance, Dec. 1, 1927		\$7,029 20

WESTERN AVENUE BRIDGE CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1926	\$325,000 00	
<i>Expenditures</i>		
Construction:		
Labor and materials	\$2,014 60	
Interest	42	
	<hr/>	
	\$2,015 02	
Amounts charged to Dec. 1, 1926	303,082 93	305,097 95
	<hr/>	
Balance, Dec. 1, 1927		\$19,902 05

RIVER STREET, BRIGHTON STREET BRIDGE CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1926	\$300,000 00	
Chapter 320, Acts of 1927	10,000 00	
	<hr/>	
	\$310,000 00	
<i>Expenditures</i>		
Construction:		
Labor and materials	\$3,024 95	
Interest	19,246 75	
	<hr/>	
	\$22,271 70	
Amounts charged to Dec. 1, 1926	282,413 47	304,685 17
	<hr/>	
Balance, Dec. 1, 1927		\$5,314 83

NEWTON-WELLESLEY BRIDGE CONSTRUCTION FUND

Appropriation (Chapter 283, Acts of 1927)	\$50,000 00	
Receipts for year ending Nov. 30, 1927	670 77	
	<hr/>	
	\$50,670 77	
<i>Expenditures</i>		
Construction:		
Contract:		
C. & R. Const. Co.	\$18,297 09	
Labor and materials	213 94	
	<hr/>	
	\$18,511 03	
Engineering:		
Services	\$3,268 21	
Supplies	2,439 14	
	<hr/>	
	5,707 35	
Advertising	107 55	
Printing contracts, etc.	113 81	
	<hr/>	
		24,439 74
	<hr/>	
Balance, Dec. 1, 1927		\$26,231 03

Miscellaneous

METROPOLITAN PARKS EXPENSE FUND

Receipts, Dec. 1, 1926 to Dec. 1, 1927:		
Bath Houses:		
Revere Beach:		
Sale of tickets	\$23,039 80	
Miscellaneous	95 45	
	<hr/>	
		\$23,135 25
Nantasket Beach:		
Sale of tickets	\$13,948 45	
Steam furnished	2,804 71	
Miscellaneous	2 00	
	<hr/>	
		16,755 16
Nahant Beach:		
Tickets		7,447 75
Magazine Beach:		
Tickets		1,625 55
Blue Hills:		
Tickets		265 00
	<hr/>	
		\$49,228 71

Metropolitan Parks Expense Fund — Continued

Rentals:			
Buildings	\$46,905 00		
Houses	1,201 25		
Locations	1,246 48		
Ducts	2,883 38		
Land	4,287 83		
Miscellaneous	1 00		
		\$56,524 94	
Sales:			
Wood	\$1,943 35		
Old metal, lumber, etc.	324 40		
Hay and grass	320 00		
Land	2,500 00		
Shrubs	400 00		
Miscellaneous	472 29		
		5,960 04	
Court fines		14,375 00	
Income on investments and interest on daily balance		12,099 93	
Privileges		8,116 67	
Deposit for sidewalks under John W. Weeks Bridge		6,144 06	
Sidewalk and entrance construction		3,760 84	
Policing Water Board lands		6,883 94	
Repaving Wellington Bridge, reimbursement		2,986 60	
Repairing bridge, Revere, reimbursement		377 06	
Damage to property		551 17	
Cement bags returned		204 92	
Boat hire		949 10	
Miscellaneous		276 40	
		\$168,439 38	
Receipts, prior to Dec. 1, 1926		2,990,384 51	
			\$3,158,823 89
Expenditures, Dec. 1, 1926 to Dec. 1, 1927:			
General Expense:			
Interest and premium on securities purchased	\$3,768 82		
Advertising	37 57		
		\$3,806 39	
Police:			
Repairs to uniforms		744 95	
Engineering:			
Sidewalks under John W. Weeks Bridge	\$6,144 06		
Tickets, etc.	61 81		
		6,205 87	
Blue Hills Reservation:			
Boats	\$307 13		
Bath house expense	21 40		
		328 53	
Stony Brook Reservation:			
Repairs to houses		166 62	
Quincy Shore Reservation:			
Sidewalk and entrance construction:			
Cost		147 44	
Blue Hills Parkway:			
Sidewalk and entrance construction:			
Refund		153 38	
Old Colony Parkway:			
Sidewalk and entrance construction:			
Refund		11 50	
Middlesex Fells Reservation:			
Repairs to houses		219 41	
Middlesex Fells Parkway:			
Sidewalk and entrance construction:			
Cost	\$1,242 46		
Refund	466 26		
		1,708 72	
Mystic Valley Parkway:			
Sidewalk and entrance construction:			
Cost	\$285 15		
Refund	45 35		
		330 50	
Lynn Fells Parkway:			
Sidewalk and entrance construction:			
Cost		32 45	
Alewife Brook Parkway:			
Sidewalk and entrance construction:			
Cost		373 75	
Middlesex Fells Roads:			
Sidewalk and entrance construction:			
Cost		175 85	

Metropolitan Parks Expense Fund — Concluded

Revere Beach Reservation:		
Bath House:		
Payrolls	\$23,015 93	
Bathing suits, etc.	2,413 53	
Heat, light and power	3,848 52	
Hardware, etc.	684 53	
Office supplies and expenses	433 47	
Repairs	21,714 00	
Medicines and attendance	61 95	
Miscellaneous supplies	2,743 36	
		\$54,915 29
Sidewalk and entrance construction:		
Cost	\$144 55	
Refund	102 53	
		247 08
		\$55,162 37
Lynn Shore Reservation:		
Sidewalk and entrance construction:		
Cost		91 62
Revere Beach Parkway:		
Sidewalk and entrance construction:		
Cost	\$339 99	
Refund	66 56	
		406 55
Nahant Beach Parkway:		
Bath House:		
Payrolls	\$9,304 95	
Bathing suits, etc.	337 32	
Heat, light and power	518 86	
Hardware, etc.	58 38	
Office supplies and expenses	149 85	
Repairs	450 97	
Medicines and attendance	16 56	
Miscellaneous supplies	421 03	
		11,257 92
Charles River Upper Division:		
Filling material		53 90
Riverside Recreation Grounds:		
Water rates		49 60
Fresh Pond Parkway:		
Sidewalk and entrance construction:		
Cost		70 28
Charles River Lower Basin:		
Magazine Beach Bath House:		
Payrolls	\$2,690 04	
Heat, light and power	31 67	
Hardware, etc.	54 31	
Office supplies and expenses	40 00	
Medicines and attendance	5 92	
Miscellaneous supplies	50 21	
		\$2,872 15
Repairs to tea-house	69 39	
		2,941 54
Cambridge Parkway:		
Temporary road at Western Avenue:		
Labor and materials	\$893 20	
Lighting	651 44	
		1,544 64
Bunker Hill:		
Lighting	\$155 72	
Telephone	17 33	
		173 05
Nantasket Beach Reservation:		
Bath House:		
Payrolls	\$17,366 22	
Bathing suits, etc.	28 52	
Heat, light and power	1,491 03	
Hardware, etc.	260 45	
Office supplies and expenses	114 38	
Medicines and attendance	28 42	
Miscellaneous supplies	1,530 45	
		\$20,819 47
Repairs to buildings	12,861 20	
Sea-wall	5,403 92	
Physician's services	43 00	
		39,127 59
		\$125,284 42
Expenditures prior to Dec. 1, 1926		2,673,009 06
		2,798,293 48
Balance, Dec. 1, 1927		\$360,530 41

METROPOLITAN PARKS TRUST FUND

Receipts:			
For the year ending Nov. 30, 1927	.	.	\$110 01
For the period prior to Dec. 1, 1926	.	.	40,883 73
			\$40,993 74
Expenditures:			
For the year ending Nov. 30, 1927	.	.	-
For the period prior to Dec. 1, 1926	.	.	\$38,106 50
			38,106 50
Balance, Dec. 1, 1927	.	.	\$2,887 24

EDWIN U. CURTIS MEMORIAL TRUST FUND

Receipts:			
For the year ending Nov. 30, 1927	.	.	\$42 47
For the period prior to Dec. 1, 1926	.	.	1,415 63
			\$1,458 10
No expenditures	.	.	-
Balance, Dec. 1, 1927	.	.	\$1,458 10

JOHN W. WEEKS BRIDGE TRUST FUND

Receipts:			
For the year ending Nov. 30, 1927	.	.	\$708 92
For the period prior to Dec. 1, 1926	.	.	234,877 33
			\$235,586 25
Expenditures:			
For the year ending Nov. 30, 1927	.	.	\$81,858 54
For the period prior to Dec. 1, 1926	.	.	153,429 36
			235,287 90
Balance, Dec. 1, 1927	.	.	\$298 35

GENERAL REVENUE, BUNKER HILL MONUMENT

Receipts:			
For the year ending Nov. 30, 1927	.	.	\$4,794 40
For the period prior to Dec. 1, 1926	.	.	21,188 40
			\$25,982 80

Maintenance

METROPOLITAN PARKS MAINTENANCE FUND, GENERAL

Appropriation (Chapter 138, Acts of 1927)		\$808,486 88
Balance brought forward from 1926 appropriation to cover 1926 expenditures on 1927 books		35,142 42
		\$843,629 30

		Expenditures	
Administration:			
Police	.	.	\$232,610 88
Salaries:			
Commissioners	.	.	\$2,500 00
Secretary, clerks, etc.	.	.	9,371 81
Chief Engineer and Assistants	.	.	21,883 87
			33,755 68
Rent, care and lighting of building	.	.	2,510 49
Stationery, office supplies and expenses	.	.	2,410 98
Printing	.	.	240 59
Engineering supplies and expenses:			
General	.	.	\$1,506 62
Auto expenses	.	.	753 73
			2,260 35
Pensions and annuities	.	.	23,849 85
			\$297,638 82
Blue Hills Reservation:			
Labor and teaming:			
General	.	.	\$40,166 22
Moth work	.	.	32,991 19
Road repairs	.	.	7,366 00
			\$80,523 41
Supplies and miscellaneous expenses:			
General	.	.	\$13,646 24
Moth work	.	.	2,293 79
Road repairs	.	.	1,358 28
			17,298 31
			97,821 72
Stony Brook Reservation:			
Labor and teaming:			
General	.	.	\$1,379 27
Moth work	.	.	7,727 11
			\$9,106 38
Supplies and miscellaneous expenses:			
General	.	.	\$1,818 79
Moth work	.	.	1,070 68
			2,889 47
			11,995 85

Metropolitan Parks Maintenance Fund, General — Continued

Neponset River Reservation:

Labor and teaming:

General	\$6 75
Moth work	1,615 25

\$1,622 00

Supplies and miscellaneous expenses:

General	285 56
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\$1,907 56

Quincy Shore Reservation:

Labor and teaming:

General	\$7,198 22
Road repairs	908 00

\$8,106 22

Street lighting

3,167 99

Supplies and miscellaneous expenses:

General	\$1,141 65
Moth work	292 80
Road repairs	16 25

1,450 70

12,724 91

Middlesex Fells Reservation:

Labor and teaming:

General	\$51,075 22
Moth work	28,494 35
Road repairs	5,878 25

\$85,447 82

Supplies and miscellaneous expenses:

General	\$23,340 78
Moth work	1,755 20
Road repairs	490 67

25,586 65

111,034 47

Mystic River Reservation:

Labor and teaming:

General	\$14,321 55
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Supplies and miscellaneous expenses:

General	2,604 39
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16,925 94

Revere Beach Reservation:

Labor and teaming:

General	\$45,623 66
Road repairs	47 50

45,671 16

Street lighting

8,242 00

Supplies and miscellaneous expenses:

General	13,917 52
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Sea wall

5,724 70

73,555 38

Lynn Shore Reservation:

Labor and teaming:

General	\$10,363 72
Road repairs	9 9 00

\$11,272 72

Street lighting

2,850 00

Supplies and miscellaneous expenses:

General	\$2,849 91
Road repairs	2,502 24

5,352 15

19,474 87

Winthrop Shore Reservation:

Labor and teaming:

General	\$5,606 01
Road repairs	381 50

\$5,987 51

Street lighting

665 28

Supplies and miscellaneous expenses:

General	\$1,880 07
Road repairs	438 41

2,318 48

Sea wall

4,725 12

13,696 39

Charles River Upper Division:

Labor and teaming:

General	\$44,045 23
Moth work	4,772 25
Road repairs	1,478 50

\$50,295 98

Street lighting

1,625 81

Supplies and miscellaneous expenses:

General	\$23,003 06
Road repairs	2,480 82

25,483 88

77,405 67

Riverside Recreation Grounds:

Labor and teaming:

General	\$5,066 50
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Supplies and miscellaneous expenses:

General	3,225 37
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8,291 87

Metropolitan Parks Maintenance Fund, General — Concluded

Beaver Brook Reservation:			
Labor and teaming:			
General	.	.	\$2,811 60
Moth work	.	.	703 50
			<u>\$3,515 10</u>
Supplies and miscellaneous expenses:			
General	.	.	1,381 19
			<u>\$4,896 29</u>
Cambridge Parkway:			
Labor and teaming:			
General	.	.	\$31,395 54
Moth work	.	.	911 50
Road repairs	.	.	2,137 50
			<u>\$34,444 54</u>
Street lighting	.	.	3,531 31
Supplies and miscellaneous expenses:			
General	.	.	\$17,139 74
Road repairs	.	.	1,701 55
			<u>18,841 29</u>
			<u>56,817 14</u>
John W. Weeks Bridge:			
Labor and teaming:			
General	.	.	\$22 50
Street lighting	.	.	42 48
Supplies and miscellaneous expenses:			
General	.	.	294 64
			<u>359 62</u>
			<u>\$804,546 50</u>
Balance, Dec. 1, 1927	.	.	\$39,082 80

METROPOLITAN PARKS MAINTENANCE FUND, SPECIALS

BAND CONCERTS			
Appropriation (Chapter 138, Acts of 1927)	.	.	\$20,000 00
Expenditures			
Advertising	.	.	\$29 70
Bands:			
Blue Hills Division	.	.	\$1,013 20
Middlesex Fells Division	.	.	2,270 00
Revere Beach Division	.	.	3,792 75
Charles River Upper Division	.	.	2,767 65
Nantasket Beach Division	.	.	8,804 50
Bunker Hill	.	.	165 00
			<u>18,813 10</u>
			<u>18,842 80</u>
Balance, Dec. 1, 1927	.	.	\$1,157 20
CLEARING WOODS			
Appropriation (amount approved by Workmen's Compensation Act)	.	.	\$2,883 86
Expended to Dec. 1, 1926	.	.	2,031 86
			<u>\$852 00</u>
Expenditures			
Industrial accident compensation	.	.	696 43
			<u>\$155 57</u>
Balance, Dec. 1, 1927	.	.	
QUINCY SHORE RESERVATION			
Appropriation (Chapter 79, Acts of 1926)	.	.	\$140,000 00
Expended to Dec. 1, 1926	.	.	126,730 61
			<u>\$13,269 39</u>
No expenditures	.	.	-
			<u>¹ \$13,269 39</u>
Balance, Dec. 1, 1927	.	.	
WATER PIPE, REVERE BEACH RESERVATION			
Appropriation (Chapter 79, Acts of 1926)	.	.	\$7,500 00
Expended to Dec. 1, 1926	.	.	-
			<u>\$7,500 00</u>
Expenditures			
Labor and materials	.	.	7,429 59
			<u>\$70 41</u>
Balance, Dec. 1, 1927	.	.	

¹ Reverted.

Metropolitan Parks Maintenance Fund, Specials — Concluded

CERTAIN LANDS, MYSTIC LAKES

Appropriation (Chapter 398, Acts of 1926)	\$25,000 00
Expended to Dec. 1, 1926	—
	<hr/>
No expenditures	\$25,000 00
	<hr/>
Balance, Dec. 1, 1927	\$25,000 00

PARKING SPACES, NAHANT BEACH

Appropriation (Chapter 343, Acts of 1927)	\$8,000 00
<i>Expenditures</i>	
Labor	\$459 00
Materials	7,096 27
Engineering:	
Services	\$315 00
Expenses	13 60
	<hr/>
Advertising	328 60
	12 30
	<hr/>
	7,896 17
	<hr/>
Balance, Dec. 1, 1927	\$103 83

SKATING POND, BLUE HILLS

Appropriation (Chapter 343, Acts of 1927)	\$1,500 00
<i>Expenditures</i>	
Labor	\$331 00
Materials	523 14
	<hr/>
	854 14
	<hr/>
Balance, Dec. 1, 1927	\$645 86

LAND FOR RESERVATION, CHARLES RIVER, DEDHAM

Appropriation (Chapter 343, Acts of 1927)	\$75,000 00
<i>Expenditures</i>	
Land	\$36,245 01
Engineering:	
Services	\$760 60
Expenses	7 75
	<hr/>
	768 35
Legal:	
Services	\$12 15
Expenses	19 10
	<hr/>
	31 25
	<hr/>
	37,044 61
	<hr/>
Balance, Dec. 1, 1927	\$37,955 39

METROPOLITAN PARKS MAINTENANCE FUND, BOULEVARDS, GENERAL

Appropriation (Chapter 138, Acts of 1927)	\$430,000 00
Balance brought forward from 1926 appropriation to cover 1926 expenditures on 1927 books	42,327 17
	<hr/>
	\$472,327 17

Expenditures

<i>Administration:</i>	
Police	\$100,371 24
<i>Salaries:</i>	
Commissioners	\$2,500 00
Secretary, clerks, etc.	9,701 00
Chief Engineer and assistants	20,068 99
	<hr/>
	32,269 99
Rent, care and lighting of building	3,194 38
Stationery, office supplies and expenses	1,987 55
Printing	240 59
Engineering supplies and expenses:	
General	\$1,389 24
Auto expenses	927 33
	<hr/>
	2,316 57
	<hr/>
	\$140,380 32
<i>Blue Hills Parkway:</i>	
Labor and teaming:	
General	\$6,327 73
Street Lighting	3,114 14
Supplies and miscellaneous expenses:	
General	\$1,413 26
Road repairs	85 30
	<hr/>
	1,498 56
	<hr/>
	10,940 43
<i>Neponset River Parkway:</i>	
Labor and teaming:	
General	\$992 25
Supplies and miscellaneous expenses:	
General	299 57
	<hr/>
	1,291 82

Metropolitan Parks Maintenance Fund, Boulevards, General — Continued

Furnace Brook Parkway:			
Labor and teaming:			
General		\$6,223 13	
Street lighting		3,563 17	
Supplies and miscellaneous expenses:			
General	\$1,047 59		
Road repairs	209 04		
		1,256 63	
			\$11,042 93
Old Colony Parkway:			
Labor and teaming:			
General	\$3,282 50		
Moth work	185 34		
		\$3,467 84	
Street lighting		2,130 76	
Supplies and miscellaneous expenses:			
General	\$709 61		
Road repairs	46 89		
		756 50	
			6,355 10
West Roxbury Parkway:			
Labor and teaming:			
General	\$1,176 86		
Road repairs	370 20		
		\$1,547 06	
Supplies and miscellaneous expenses:			
General	\$1,232 22		
Road repairs	379 19		
		1,611 41	
			3,158 47
Dedham Parkway:			
Labor and teaming:			
General	\$399 00		
Moth work	191 55		
		\$590 55	
Supplies and miscellaneous expenses:			
General	\$293 61		
Road repairs	239 72		
		533 33	
			1,123 88
Middlesex Fells Parkway:			
Labor and teaming:			
General	\$23,493 10		
Moth work	357 96		
Road repairs	4,523 55		
		\$28,374 61	
Street lighting		19,306 77	
Supplies and miscellaneous expenses:			
General	\$6,434 92		
Road repairs	1,563 50		
		7,998 42	
			55,679 80
Mystic Valley Parkway:			
Labor and teaming:			
General	\$21,450 09		
Moth work	1,142 90		
Road repairs	393 00		
		\$22,985 99	
Street lighting		4,659 40	
Supplies and miscellaneous expenses:			
General	\$15,325 68		
Road repairs	784 50		
		16,110 18	
			43,755 57
Lynn Fells Parkway:			
Labor and teaming:			
General	\$4,858 84		
Road repairs	127 00		
		\$4,985 84	
Street lighting		1,223 38	
Supplies and miscellaneous expenses:			
General		757 77	
			6,966 99
Middlesex Fells Roads:			
Labor and teaming:			
General	\$7,765 01		
Road repairs	5,398 07		
		\$13,163 08	
Street lighting		3,131 44	
Supplies and miscellaneous expenses:			
General	\$1,220 78		
Road repairs	822 30		
		2,043 08	
			18,337 60

Metropolitan Parks Maintenance Fund, Boulevards, General — Continued

Woburn Parkway:			
Labor and teaming:			
General	\$3,918 64		
Moth work	94 50		
		\$4,013 14	
Supplies and miscellaneous expenses:			
General		1,053 88	
			\$5,067 02
Alewife Brook Parkway:			
Labor and teaming:			
General	\$9,174 68		
Moth work	183 92		
Road repairs	189 00		
		\$9,547 60	
Street lighting		860 07	
Supplies and miscellaneous expenses:			
General	\$5,950 53		
Road repairs	113 48		
		6,064 01	
			16,471 68
Revere Beach Parkway:			
Labor and teaming:			
General	\$29,314 70		
Moth work	18 50		
Road repairs	4,424 00		
		\$33,757 20	
Street lighting		13,683 58	
Supplies and miscellaneous expenses:			
General	\$10,242 30		
Road repairs	5,360 94		
		15,603 24	
			63,044 02
Nahant Beach Parkway:			
Labor and teaming:			
General		\$6,451 29	
Street lighting		980 00	
Supplies and miscellaneous expenses:			
General		455 02	
			7,886 31
Winthrop Parkway:			
Labor and teaming:			
General	\$1,961 25		
Road repairs	165 50		
		\$2,126 75	
Street lighting		1,385 76	
Supplies and miscellaneous expenses:			
General	\$292 43		
Road repairs	101 38		
		393 81	
			3,906 32
Lynnway:			
Labor and teaming:			
General	\$11,997 10		
Road repairs	325 50		
		\$12,322 60	
Street lighting		344 36	
Supplies and miscellaneous expenses:			
General	\$2,337 66		
Road repairs	111 36		
		2,449 02	
			15,115 98
Hammond Pond Parkway:			
Labor and teaming:			
General	\$211 50		
Moth work	2,036 25		
		\$2,247 75	
Supplies and miscellaneous expenses:			
General		177 20	
			2,424 95
Fresh Pond Parkway:			
Labor and teaming:			
General	\$4,364 50		
Moth work	334 00		
		\$4,698 50	
Street lighting		326 53	
Supplies and miscellaneous expenses:			
General		1,119 34	
			6,144 37
Cottage Farm Bridge:			
Labor and teaming:			
General	\$6,651 70		
Road repairs	432 00		
		\$7,083 70	
Street lighting		514 43	
Supplies and miscellaneous expenses:			
General	\$79 47		
Road repairs	166 14		
		245 61	
			7,843 74

Metropolitan Parks Maintenance Fund, Boulevards, General — Concluded

Harvard Bridge:		
Labor and teaming:		
General	\$6,390 17	
Road repairs	373 75	
		\$6,763 92
Street lighting		2,132 83
Supplies and miscellaneous expenses:		
General	\$274 50	
Road repairs	43 22	
		317 72
		\$9,214 47
Neponset Bridge:		
Labor and teaming:		
General		\$9,546 94
Street lighting		1,321 82
Supplies and miscellaneous expenses:		
General		1,730 61
		12,599 37
Western Avenue Bridge:		
Street lighting		45 83
		\$448,796 97
Balance, Dec. 1, 1927		\$23,530 20

METROPOLITAN PARKS MAINTENANCE FUND, BOULEVARDS — SPECIALS

BLUE HILL RIVER ROAD

Appropriation (Chapter 211, Acts of 1925, reappropriated)	\$75,000 00
Appropriation (Chapter 311, Acts of 1927)	25,000 00
	\$100,000 00
<i>Expenditures</i>	
Construction:	
Contract, James H. Fannon	\$28,389 81
Engineering:	
Services	\$7,649 75
Expenses	646 38
	8,296 13
Advertising	74 90
	36,760 84
Balance, Dec. 1, 1927	\$63,239 16

WEST ROXBURY PARKWAY EXTENSION

Appropriation (Chapter 313, Acts of 1925)	\$222,000 00
Expended to Dec. 1, 1926	110,015 63
	\$111,984 37
<i>Expenditures</i>	
Construction:	
Contract, Thomas J. McCue Const. Co.	\$23,581 51
Labor and materials	1,987 68
	\$25,569 19
Land	1,821 50
Engineering:	
Services	\$2,508 23
Expenses	93 43
	2,601 66
Legal:	
Services	\$4 29
Expenses	2 02
	6 31
	29,998 66
	\$81,985 71
Less amount, Chapter 231, Acts of 1927	50,000 00
Balance, Dec. 1, 1927	¹ \$31,985 71

PARKWAY IN BROOKLINE

Appropriation (Chapter 231, Acts of 1927)	\$50,000 00
<i>Expenditures</i>	
Land	\$4,197 18
Legal:	
Expenses	3 09
	4,200 27
Balance, Dec. 1, 1927	\$45,799 73

ELECTRIC LIGHTING SYSTEM

Appropriation (Chapter 138, Acts of 1927)	\$50,000 00
Balance brought forward from 1926 appropriation to cover 1926 expenditures on 1927 books	7,806 72
	\$57,806 72

¹ Reverted.

Metropolitan Parks Maintenance Fund, Boulevards — Specials — Continued
Electric Lighting System — Concluded

Expenditures

Installation of conduits, etc.:		
Labor and materials	\$50,473 35	
Physicians' services	25 50	
		\$50,498 85
Balance, Dec. 1, 1927		\$7,307 87

RESURFACING BOULEVARDS AND PARKWAYS

Appropriation (Chapter 138, Acts of 1927)	\$100,000 00
Balance brought forward from 1926 appropriation to cover 1926 expenditures on 1927 books	25,294 73
	\$125,294 73

Expenditures

Stony Brook Reservation:		
Construction:		
Contract, Coleman Bros., Inc.	\$39,123 37	
Labor and materials	12,766 40	
		\$51,889 77
Engineering:		
Services	\$3,947 66	
Expenses	270 90	
		4,218 56
Advertising		58 25
		\$56,166 58
Cambridge Parkway:		
Construction:		
Contract, Simpson Bros. Corp.	\$22,129 76	
Labor and materials	520 43	
		\$22,650 19
Engineering:		
Services	1,030 65	
Advertising	155 75	
		23,836 59
Middlesex Fells Parkway:		
Construction:		
Contract, James H. Fannon	\$7,346 15	
Labor and materials	10,347 90	
		\$17,694 05
Physicians' services	29 00	
Industrial accident compensation	112 00	
		17,835 05
Revere Beach Parkway:		
Construction:		
Labor and materials		23,360 01
		121,198 23
Balance, Dec. 1, 1927		\$4,096 50

QUINCY SHORE ROADWAY

Appropriation (Chapter 79, Acts of 1926)	\$140,000 00
Expended to Dec. 1, 1926	85,996 52
	\$54,003 48

Expenditures

Construction:		
Contract, Paul Caputo	\$36,686 51	
Labor and materials	2,534 21	
		\$39,220 72
Engineering:		
Services	\$90 00	
Expenses	26 98	
		116 98
		39,337 70
Balance, Dec. 1, 1927		\$14,665 78

LAND FOR BOULEVARD, STONEHAM

Appropriation (Chapter 398, Acts of 1926)	\$10,000 00
Expended to Dec. 1, 1926	1,312 27
	\$8,687 73

Expenditures

Engineering:		
Services	\$2,172 91	
Expenses	27 90	
		2,200 81
Balance, Dec. 1, 1927		\$6,486 92

OLD COLONY BOULEVARD

Appropriation (Chapter 398, Acts of 1926)	\$250,000 00
Appropriation (Chapter 138, Acts of 1927)	500,000 00
	\$750,000 00
Expended to Dec. 1, 1926	35,841 85
	\$714,158 15

Metropolitan Parks Maintenance Fund, Boulevards — Specials — Continued
Old Colony Boulevard — Concluded

Expenditures

Construction:			
Contracts:			
Coleman Bros., Inc.		\$113,878 31	
Aberthaw Co.		84,511 55	
			\$198,389 86
Labor and materials			31,451 19
			\$229,841 05
Land			36,395 40
Engineering:			
Services		\$12,752 70	
Expenses		277 52	
			13,030 22
Legal:			
Services		\$5 69	
Expenses		3 07	
			8 76
Claims			25 00
Architect's services, plans, etc.			5,880 00
Printing contracts			118 09
Advertising			129 50
			\$285,428 02
Balance, Dec. 1, 1927			\$428,730 13

COTTAGE FARM BOULEVARD

Appropriation (Chapter 398, Acts of 1926)	\$50,000 00
Expended to Dec. 1, 1926	317 17
	\$49,682 83

Expenditures

Construction:			
Contract, Bay State Dredging & Cont. Co.		\$8,979 14	
Labor and materials		32,979 17	
			\$41,958 31
Engineering:			
Expenses			7 46
Legal:			
Services		42 51	
Claims		730 00	
			42,738 28
Balance, Dec. 1, 1927			\$6,944 55

CIRCUMFERENTIAL HIGHWAY

Appropriation (Chapter 398, Acts of 1926)	\$115,000 00
Expended to Dec. 1, 1926	360 00
	\$114,640 00

Expenditures

Construction:			
Labor and materials			\$287 75
Engineering:			
Services		\$5,331 74	
Expenses		470 58	
			5,802 32
Legal:			
Services		\$17 10	
Expenses		50 59	
			67 69
Claims			2,200 00
			8,357 76
Balance, Dec. 1, 1927			\$106,282 24

EXTENSION OF QUINCY SHORE RESERVATION

Appropriation (Chapter 343, Acts of 1927)	\$35,000 00
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Expenditures

Engineering:			
Services		\$869 71	
Expenses		7 95	
			877 66
Balance, Dec. 1, 1927			\$34,122 34

LAND FOR NORTH HARVARD STREET, WESTERN AVENUE BOULEVARD

Appropriation (Chapter 343, Acts of 1927)	\$80,000 00
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Expenditures

Legal:			
Services			15 72
Balance, Dec. 1, 1927			\$79,984 28

Metropolitan Parks Maintenance Fund, Boulevards — Specials — Concluded
NORTH HARVARD STREET, WESTERN AVENUE BOULEVARD

Appropriation (Chapter 398, Acts of 1926)	\$70,000 00
Expended to Dec. 1, 1926	31,525 63
	<hr/>
	\$38,474 37

Expenditures

Construction:			
Contracts:			
Thomas J. McCue Const. Co.	\$25,658 49		
T. Stuart & Son Co.	2,200 00		
	<hr/>	\$27,858 49	
Labor and materials		4,921 54	
		<hr/>	\$32,780 03
Engineering:			
Services		\$1,823 26	
Expenses		34 31	
		<hr/>	1,857 57
			<hr/>
			34,637 60
Balance, Dec. 1, 1927			<hr/>
			\$3,836 77

CHARLES RIVER BASIN MAINTENANCE

Appropriation (Chapter 138, Acts of 1927)	\$201,500 00
Balance brought forward from 1926 appropriation to cover 1926 expenditures on 1927 books	11,753 84
	<hr/>
	\$213,253 84

Expenditures

Park and Water Areas:			
Police		\$71,523 30	
Labor and teaming:			
General	\$41,543 74		
Road repairs	450 00		
	<hr/>	41,993 74	
Street lighting		4,371 19	
Supplies and miscellaneous expenses:			
General		8,245 77	
		<hr/>	\$126,134 00
Locks, Gates and Drawbridges:			
General labor		\$54,545 45	
General supplies and miscellaneous expenses		10,353 73	
		<hr/>	64,899 18
			<hr/>
			191,033 18
Balance, Dec. 1, 1927			<hr/>
			\$22,220 66

NANTASKET BEACH MAINTENANCE

Appropriation (Chapter 138, Acts of 1927)	\$83,400 00
Balance brought forward from 1926 appropriation to cover 1926 expenditures on 1927 books	2,447 20
	<hr/>
	\$85,847 20

Expenditures

Police		\$27,646 12	
Labor and teaming:			
General		38,599 92	
Street lighting		1,884 49	
Supplies and miscellaneous expenses:			
General	\$11,662 32		
Road repairs	893 69		
	<hr/>	12,556 01	
		<hr/>	80,686 54
Balance, Dec. 1, 1927			<hr/>
			\$5,160 66

WELLINGTON BRIDGE MAINTENANCE

Appropriation (Chapter 138, Acts of 1927)	\$14,000 00
Balance brought forward from 1926 appropriation to cover 1926 expenditures on 1927 books	734 51
	<hr/>
	\$14,734 51

Expenditures

General labor		\$10,883 15	
Street lighting		451 16	
General supplies and miscellaneous expenses		1,979 52	
		<hr/>	13,313 83
Balance, Dec. 1, 1927			<hr/>
			\$1,420 68

BUNKER HILL MAINTENANCE

Appropriation (Chapter 138, Acts of 1927)	\$11,500 00
Appropriation (Chapter 343, Acts of 1927)	69 34
	<hr/>
	\$11,569 34

Bunker Hill Maintenance — Concluded

Expenditures

Police	\$4,159 97	
Labor and teaming:		
General	4,827 32	
Flood lighting	122 40	
Supplies and miscellaneous expenses:		
General	1,594 83	
		<u>\$10,704 52</u>
Balance, Dec. 1, 1927		\$864 82

Analysis of 1927 Receipts

Credited to:		
Metropolitan Parks Expense Fund	\$168,447 12	
General Revenue	4,794 40	
		<u>\$173,241 52</u>

Bonds, Sinking Funds and Net Debt

METROPOLITAN PARKS CONSTRUCTION, SERIES I

Bonds issued:			
Sinking Fund:			
Year ending Nov. 30, 1927	—		
Period prior to Dec. 1, 1926	\$9,485,000 00		
		<u>\$9,485,000 00</u>	
Serial Bonds and Notes:			
Year ending Nov. 30, 1927	\$43,043 96		
Period prior to Dec. 1, 1926	324,000 00		
		<u>367,043 96</u>	
			\$9,852,043 96
Serial Bonds and Notes paid:			
Year ending Nov. 30, 1927	\$55,793 96		
Period prior to Dec. 1, 1926	234,000 00		
		<u>289,793 96</u>	
Bonds outstanding Dec. 1, 1927			\$9,562,250 00
Sinking Fund:			
Total, Dec. 1, 1927		\$5,936,887 78	
Total, Dec. 1, 1926		5,654,500 89	
Increase during 1927			<u>\$282,386 89</u>
Net Debt:			
Total, Dec. 1, 1927		\$3,625,362 22	
Total, Dec. 1, 1926		3,920,499 11	
Decrease during 1927			<u>\$295,136 89</u>

METROPOLITAN PARKS CONSTRUCTION, SERIES II

Bonds issued:			
Sinking Fund:			
Year ending Nov. 30, 1927	—		
Period prior to Dec. 1, 1926	\$2,567,500 00		
		<u>\$2,567,500 00</u>	
Serial Bonds and Notes:			
Year ending Nov. 30, 1927	\$9,119 12		
Period prior to Dec. 1, 1926	2,373,937 50		
		<u>2,383,056 62</u>	
			\$4,950,556 62
Serial Bonds paid:			
Year ending Nov. 30, 1927	\$112,437 50		
Period prior to Dec. 1, 1926	577,625 00		
		<u>690,062 50</u>	
Bonds outstanding Dec. 1, 1927			\$4,260,494 12
Sinking Fund:			
Total, Dec. 1, 1927		\$1,507,658 79	
Total, Dec. 1, 1926		1,435,951 37	
Increase during 1927			<u>\$71,707 42</u>
Net Debt:			
Total, Dec. 1, 1927		\$2,752,835 33	
Total, Dec. 1, 1926		2,927,861 13	
Decrease during 1927			<u>\$175,025 80</u>

CHARLES RIVER BASIN CONSTRUCTION

Bonds issued:			
Sinking Fund:			
Year ending Nov. 30, 1927	—		
Period prior to Dec. 1, 1926	\$4,125,000 00		
		<u>\$4,125,000 00</u>	
Serial Bonds:			
Year ending Nov. 30, 1927	—		
Period prior to Dec. 1, 1926	\$375,000 00		
		<u>375,000 00</u>	
			\$4,500,000 00

Charles River Basin Construction — Concluded

Serial Bonds paid:			
Year ending Nov. 30, 1927	\$10,000 00		
Period prior to Dec. 1, 1926	142,000 00		
		\$152,000 00	
Bonds outstanding Dec. 1, 1927			\$4,348,000 00
Sinking Fund:			
Total, Dec. 1, 1927	\$1,903,269 95		
Total, Dec. 1, 1926	1,817,269 44		
Increase during 1927			\$86,000 51
Net Debt:			
Total, Dec. 1, 1927	\$2,444,730 05		
Total, Dec. 1, 1926	2,540,730 56		
Decrease during 1927			\$96,000 51

CHARLES RIVER BRIDGES CONSTRUCTION

Notes issued: ¹			
Year ending Nov. 30, 1927	\$2,550,000 00		
Period prior to Dec. 1, 1926	1,100,000 00		
			\$3,650,000 00
Notes paid:			
Year ending Nov. 30, 1927	\$1,200,000 00		
Period prior to Dec. 1, 1926	900,000 00		
			\$2,100,000 00
Notes outstanding:			
Year ending Nov. 30, 1927			\$1,550,000 00
Net debt, Dec. 1, 1927			\$1,550,000 00

SEWERAGE DIVISION

Construction

METROPOLITAN SEWERAGE CONSTRUCTION FUND, NORTH SYSTEM

Total amount appropriated to Dec. 1, 1926	\$8,288,500 00	
Appropriation (Chapter 138, Acts of 1927)	23,021 55	
Appropriation (Chapter 184, Acts of 1927)	450,000 00	
		\$8,761,521 55
Receipts:		
For period prior to Dec. 1, 1926	\$87,514 78	
For the year ending Nov. 30, 1927	-	
		87,514 78
		\$8,849,036 33

Expenditures

Sewer in Medford and Arlington:			
Construction:			
Contracts:			
A. Baruffaldi Co.	\$5,744 68		
Antony Cefalo	2,306 23		
Antony Cefalo	17,540 48		
		\$25,591 39	
Labor and materials		631 84	
			\$26,223 23
Land			1,798 00
Damages			1,164 69
Engineering:			
Services	\$2,150 00		
Supplies and expenses	226 60		
			2,376 60
Legal:			
Services	\$414 26		
Expenses	24 15		
			438 41
			\$32,000 93
Belmont Extension:			
Construction:			
Contracts:			
J. H. Ferguson Co.	\$58,154 39		
Labor and material	2,495 99		
			\$60,650 38
Advertising			17 20
Engineering:			
Services	\$6,393 33		
Supplies and expenses	659 77		
			7,053 10
			67,720 68

¹ Including renewals.

Metropolitan Sewerage Construction Fund, North System — Concluded

New Mystic Valley Main Sewer, Sec. 109:			
Engineering:			
Services	\$2,138	34	
Labor and material	1,190	48	
			\$3,328 82
New Mystic Valley Main Sewer, Sec. 110:			
Engineering:			
Supplies and expenses	\$211	86	
Labor and materials	221	08	
			432 94
			\$3,761 76
			\$103,483 37
Amounts charged to Dec. 1, 1926			8,114,662 12
			\$8,218,145 49
Balance, Dec. 1, 1927			\$630,890 84

METROPOLITAN SEWERAGE CONSTRUCTION FUND, SOUTH SYSTEM

Total amount appropriated to Dec. 1, 1926	\$10,002,912	00	
Appropriation (Chapter 138, Acts of 1927)	2,239	75	
			\$10,005,151 75
Receipts:			
For period prior to Dec. 1, 1926	\$24,599	61	
For the year ending Nov. 30, 1927			—
			24,599 61
			\$10,029,751 36
Expenditures			
Wellesley Sewer:			
Damages	\$275	00	
Amounts charged to Dec. 1, 1926	10,004,652	59	
			10,004,927 59
Balance, Dec. 1, 1927			\$24,823 77

Miscellaneous

SURFACE DRAINAGE IN MALDEN, EVERETT AND REVERE

Appropriation	\$70,000	00	
Expenditures			
Engineering:			
Expenses	\$1	00	
Amounts charged to Dec. 1, 1926	2,892	33	
			2,893 33
Balance, Dec. 1, 1927			\$67,106 67

Maintenance

METROPOLITAN SEWERAGE MAINTENANCE FUND, NORTH SYSTEM — GENERAL

Appropriation, Dec. 1, 1926 to Dec. 1, 1927 (Chapter 138, Acts of 1927)	\$330,000	00	
Balance brought forward from 1926 appropriation to cover 1926 expenditures on 1927 books	55,718	66	
			\$385,718 66
Expenditures			
Administration:			
Salaries:			
Commissioners	\$1,250	00	
Secretary and clerks	4,501	44	
			\$5,751 44
Rent, light and heat	3,459	52	
Stationery, office supplies and expenses	603	77	
Printing	76	93	
			\$9,891 66
Engineering:			
Salaries:			
Chief engineer and assistants	\$9,295	85	
Engineering supplies and expenses	152	53	
			9,448 38
Industrial accident compensation	2,777	57	
			\$22,117 61
Deer Island Pumping Station:			
Labor	\$37,673	83	
Fuel	24,769	34	
Oil, waste and packing	917	67	
Water	1,535	16	
Repairs and renewals	1,174	25	
General supplies	940	36	
Miscellaneous expenses	1,441	99	
			68,452 60
New wharf at Deer Island	5,998	87	

Metropolitan Sewerage Maintenance Fund, North System — General — Concluded

East Boston Pumping Station:		
Labor	\$43,164 46	
Fuel	20,655 40	
Oil, waste and packing	1,268 60	
Water	1,696 20	
Repairs, ordinary	29 86	
Repairs and renewals	1,621 69	
General supplies	1,932 97	
Miscellaneous expenses	1,318 00	
		\$71,687 18
Charlestown Pumping Station:		
Labor	\$28,291 83	
Fuel	7,906 32	
Oil, waste and packing	574 85	
Water	582 65	
Repairs and renewals	384 81	
General supplies	611 40	
Miscellaneous expenses	1,132 35	
		39,484 21
Alewife Brook Pumping Station:		
Labor	\$14,383 71	
Fuel	3,995 92	
Oil, waste and packing	357 00	
Water	901 08	
Repairs and renewals	842 57	
General supplies	477 18	
Miscellaneous expenses	799 66	
		21,757 12
Reading Pumping Station:		
Labor	\$7,113 50	
Fuel	199 70	
General supplies	4,388 32	
Miscellaneous expenses	247 65	
		11,949 17
Sewer Lines, Buildings and Grounds:		
Engineering assistants	\$3,060 00	
Labor	64,840 64	
Deer Island Ferry	1,633 34	
Automobiles	1,862 92	
Brick, cement and lime	478 24	
Castings, iron work, etc.	1,248 90	
Freight, express and teaming	11 99	
Repairs, ordinary	11 90	
Repairs and renewals	6 47	
Lumber, paint, etc.	8,005 65	
Machinery, tools and appliances	704 34	
Rubber and oiled goods	176 00	
Sand, gravel and stone	72 64	
General supplies	11,518 94	
Miscellaneous expenses	10,424 00	
		104,055 97
Stables:		
Labor	\$2,700 00	
Hay, grain and bedding	340 70	
Vehicles, harnesses, etc.	9 80	
Miscellaneous expenses	233 19	
		3,283 69
		\$348,786 42
Balance, Dec. 1, 1927		\$36,932 24

METROPOLITAN SEWERAGE MAINTENANCE FUND, NORTH SYSTEM — SPECIAL

CERTAIN RENEWALS AND IMPROVEMENTS

Appropriation (Chapter 138, Acts of 1927)	\$23,500 00	
Expenditures		
Contracts:		
International Engineering Works, Inc.	\$2,215 00	
D. M. Dillon Steam Boiler Works	8,075 00	
Starkweather & Broadhurst	3,067 50	
		\$13,357 50
Labor and materials		9,120 00
		22,477 50
Balance, Dec. 1, 1927		\$1,022 50

METROPOLITAN SEWERAGE MAINTENANCE FUND, SOUTH SYSTEM — GENERAL		
Appropriation, Dec. 1, 1926 to Dec. 1, 1927 (Chapter 138, Acts of 1927)		\$213,000 00
Balance brought forward from 1926 appropriation to cover 1926 expenditures on 1927 books		25,055 40
		<hr/>
		\$238,055 40

		Expenditures	
Administration:			
Salaries:			
Commissioners	\$1,250 00		
Secretary and clerks	3,828 57		
		\$5,078 57	
Rent, light and heat		1,889 81	
Stationery, office supplies and expenses		676 58	
Printing		76 93	
		<hr/>	\$7,721 89
Engineering:			
Chief engineer and assistants	\$8,189 99		
Engineering supplies and expenses	248 31		
		<hr/>	8,438 30
Industrial accident compensation			24 43
			<hr/>
			\$16,184 62
Ward Street Pumping Station:			
Labor		\$46,999 07	
Fuel		20,295 99	
Oil, waste and packing		1,343 28	
Water		2,142 36	
Repairs and renewals		2,450 67	
General supplies		1,210 07	
Miscellaneous expenses		2,002 11	
		<hr/>	76,443 55
Quincy Pumping Station:			
Labor		\$14,728 50	
Fuel		4,407 19	
Oil, waste and packing		628 99	
Water		405 56	
Repairs and renewals		324 14	
General supplies		201 12	
Miscellaneous expenses		217 23	
		<hr/>	20,912 73
Nut Island Screen House:			
Labor		\$15,270 50	
Fuel		4,421 71	
Oil, waste and packing		170 60	
Water		512 35	
Repairs and renewals		31 61	
General supplies		257 75	
Miscellaneous expenses		369 33	
		<hr/>	21,033 85
Sewer Lines, Buildings and Grounds:			
Engineering assistants		\$6,810 00	
Labor		49,421 52	
Automobiles		372 64	
Brick, cement and lime		59 29	
Castings, iron work, etc.		7 48	
Freight, express and teaming		78	
Fuel and lighting		46 67	
Repairs, ordinary		47 00	
Lumber, paint, etc.		706 38	
Machinery, tools and appliances		75 12	
Rubber and oiled goods		89 96	
Sand, gravel and stone		111 11	
General supplies		999 33	
Miscellaneous expenses		3,165 25	
Pumping by City of Boston		10,300 00	
		<hr/>	72,212 53
Stables:			
Labor		\$810 00	
Hay, grain and bedding		415 34	
Vehicles, harnesses, etc.		6 76	
Miscellaneous expenses		139 26	
		<hr/>	1,371 36
			<hr/>
			208,158 64
Balance, Dec. 1, 1927			<hr/>
			\$29,896 76

Analysis of 1927 Receipts		
Credited to:		
Metropolitan Sewerage Sinking Fund, North System	\$275 00	
Metropolitan Sewerage Maintenance Fund, South System	95 28	
	<hr/>	\$370 28

Metropolitan Water Construction Fund — Concluded
Expenditures

Certain Improvements:		
Improving Wachusett Watershed:		
Land	\$5,578 75	
Legal services	32 17	
	<hr/>	
	\$5,610 92	
Less amount transferred to Water Const. Fund, Special .	49,187 75	
	<hr/>	\$43,576 83 ¹
Low Service Pipe Lines, Section 51:		
Engineering:		
Services		58 33
Southern High Service, Section 52:		
Construction:		
Contract, Biggs Const. Co.	\$210,328 86	
Labor and materials	28,156 26	
	<hr/>	
	\$238,485 12	
Engineering:		
Services	\$20,032 14	
Expenses	3,284 46	
	<hr/>	
	23,316 60	
Land	969 15	
Appraising	725 00	
Legal:		
Services	\$586 48	
Expenses	22 16	
	<hr/>	
	608 64	
	<hr/>	264,104 51
Northern High Service, Section 48:		
Construction:		
Contract, Cenedella & Co.	\$14,507 48	
Engineering:		
Services	\$684 29	
Expenses	956 38	
	<hr/>	
	1,640 67	
Appraising	100 00	
Legal expenses	3 54 [*]	
	<hr/>	
		16,251 69
Meters and Connections:		
Labor		1,760 11
Weston Aqueduct Supply Mains, Section 10:		
Engineering:		
Services	\$133 13	
Labor and materials	1,688 03	
Land	150 00	
Legal services	5 61	
	<hr/>	
		1,976 77
Weston Aqueduct Supply Mains, Section 11:		
Labor and materials		1,166 96
Weston Aqueduct Supply Mains, Section 12:		
Construction:		
Contract, C. & R. Const. Co.	\$4,564 59	
Labor and materials	212 00	
	<hr/>	
	\$4,776 59	
Engineering:		
Services	168 70	
	<hr/>	
		4,945 29
Weston Aqueduct Supply Mains, Watertown Branch:		
Construction:		
Contract, C. & R. Const. Co.	\$33,764 61	
Labor and materials	6,654 00	
	<hr/>	
	\$40,418 61	
Engineering:		
Services	\$4,837 44	
Expenses	332 96	
	<hr/>	
	5,170 40	
Printing	5 82	
Legal services	106 39	
	<hr/>	
		45,701 22
Protection of Supply:		
Land	\$600 00	
Legal:		
Services	\$17 22	
Expenses	10 00	
	<hr/>	
	27 22	
	<hr/>	627 22
Stock		46,456 78
Property for Protection of Water Supply		49,190 95
		<hr/>
		\$388,663 00
Less stock transferred to other accounts		217 73
		<hr/>
		\$388,445 27
Amounts charged to Dec. 1, 1926		46,659,401 50
		<hr/>
		\$47,047,846 77
Balance, Dec. 1, 1927		<hr/>
		\$238,983 38

¹ Credit.

Maintenance

METROPOLITAN WATER MAINTENANCE FUND — GENERAL

Appropriation, Dec. 1, 1926 to Dec. 1, 1927 (Chapter 138, Acts of 1927)	\$851,000 00
Balance brought forward from 1926 appropriation to cover 1926 expenditures on 1927 books	48,709 32
	<u>\$899,709 32</u>

Expenditures

Administration:

Salaries:

Commissioners	\$2,500 00
Secretary and clerks	9,684 59

\$12,184 59

Rent, light and heat	2,465 54
Stationery, office supplies and expenses	1,760 14
Printing	153 86

\$16,564 13

Engineering:

Chief engineer and assistants	\$24,354 55
Engineering supplies and expenses	2,139 53

Biological Laboratory:

Labor	\$3,412 27
Supplies and expenses	425 68

3,837 95

30,332 03

Payments in lieu of taxes	52,990 84
Industrial accident compensation	1,008 19

\$100,895 19

Wachusett Department:

Superintendence:

Labor	\$11,506 69
Supplies and expenses	1,420 98

\$12,927 67

Reservoir:

Labor	\$23,235 65
Supplies and expenses	2,232 43

25,468 08

Forestry:

Labor	\$15,333 92
Supplies and expenses	1,535 29

16,869 21

Protection of supply:

Labor	\$7,667 15
Supplies and expenses	1,079 22

8,746 37

Buildings and grounds:

Labor	\$7,622 30
Supplies and expenses	2,062 07

9,684 37

Wachusett Dam:

Labor	\$10,116 21
Supplies and expenses	625 17

10,741 38

Wachusett Aqueduct:

Labor	\$9,739 02
Supplies and expenses	554 02

10,293 04

Clinton Sewerage System:

Pumping Station:

Labor	\$1,503 04
Supplies and expenses	2,637 22

\$4,140 26

Sewers, screens and filter beds:

Labor	\$8,799 95
Repairs and supplies	2,527 18

11,327 13

15,467 39

Sanitary inspection:

Labor	\$1,190 03
Supplies and expenses	672 60

1,862 63

Swamp drainage:

Labor	\$8,919 70
Supplies and expenses	813 44

9,733 14

Power plant:

Labor	\$9,212 14
Supplies and expenses	807 60

10,019 74

Wachusett-Sudbury Power Transmission Line:

Supplies and expenses	60 30
---------------------------------	-------

131,873 32

Sudbury Department:

Superintendence:

Labor	\$12,731 86
Supplies and expenses	2,748 30

\$15,480 16

Metropolitan Water Maintenance Fund — General — Continued

Ashland Reservoir:			
Labor	\$4,575 10		
Supplies and expenses	518 10		
			\$5,093 20
Hopkinton Reservoir:			
Labor	\$4,160 89		
Supplies and expenses	427 29		
			4,588 18
Whitehall Reservoir:			
Labor	\$4,391 02		
Supplies and expenses	86 23		
			4,477 25
Framingham Reservoirs, 1, 2 and 3:			
Labor	\$14,160 97		
Supplies and expenses	2,220 55		
			16,381 52
Sudbury Reservoir:			
Labor	\$13,151 52		
Supplies and expenses	1,682 19		
			14,833 71
Lake Cochituate:			
Labor	\$10,454 75		
Supplies and expenses	2,954 04		
			13,408 79
Marlborough Brook Filters:			
Labor	\$5,298 77		
Supplies and expenses	214 51		
			5,513 28
Pegan Filters:			
Labor	\$6,747 53		
Supplies and expenses	2,527 88		
			9,275 41
Sudbury and Cochituate Watersheds:			
Labor	\$4,741 08		
Supplies and expenses	613 01		
			5,354 09
Sanitary inspection:			
Labor	\$6,654 32		
Supplies and expenses	904 55		
			7,558 87
Cochituate Aqueduct:			
Labor	\$4,138 05		
Supplies and expenses	385 23		
			4,523 28
Sudbury Aqueduct:			
Labor	\$11,635 53		
Supplies and expenses	6,933 18		
			18,568 71
Weston Aqueduct:			
Labor	\$9,380 46		
Supplies and expenses	819 87		
			10,200 33
Forestry:			
Labor	\$11,334 36		
Supplies and expenses	373 61		
			11,707 97
Sudbury Power Plant:			
Labor	\$14,434 02		
Supplies and expenses	2,057 34		
			16,491 36
			<hr/>
			\$163,456 11
Distribution Department:			
Superintendence:			
Labor	\$12,336 28		
Supplies and expenses	1,363 43		
			\$13,699 71
Arlington Reservoir:			
Labor	\$650 08		
Supplies and expenses	392 98		
			1,043 06
Bear Hill Reservoir:			
Labor	\$270 00		
Supplies and expenses	27 10		
			297 10
Bellevue Reservoir:			
Labor	\$262 09		
Supplies and expenses	92 78		
			354 87
Chestnut Hill Reservoir and grounds:			
Labor	\$19,122 33		
Supplies and expenses	13,870 26		
			32,992 59
Fells Reservoir:			
Labor	\$1,567 50		
Supplies and expenses	603 77		
			2,171 27

Metropolitan Water Maintenance Fund — General — Continued

Fisher Hill Reservoir:				
Labor	.	.	.	\$2,275 11
Supplies and expenses	.	.	.	1,142 84
				<hr/>
				\$3,417 95
Forbes Hill Reservoir:				
Labor	.	.	.	\$1,980 13
Supplies and expenses	.	.	.	559 52
				<hr/>
				2,539 65
Mystic Reservoir:				
Labor	.	.	.	\$1,484 08
Supplies and expenses	.	.	.	80
				<hr/>
				1,484 88
Spot Pond Reservoir:				
Labor	.	.	.	\$10,374 61
Supplies and expenses	.	.	.	3,404 02
				<hr/>
				13,778 63
Waban Hill Reservoir:				
Labor	.	.	.	\$249 75
Supplies and expenses	.	.	.	95 80
				<hr/>
				345 55
Weston Reservoir:				
Labor	.	.	.	\$6,282 12
Supplies and expenses	.	.	.	1,185 73
				<hr/>
				7,467 85
Mystic Lake, Conduit and Pumping Station:				
Labor	.	.	.	\$1,722 05
Supplies and expenses	.	.	.	1,238 31
				<hr/>
				2,960 36
Buildings at Chestnut Hill Reservoir:				
Labor	.	.	.	\$5,347 25
Supplies and expenses	.	.	.	404 88
				<hr/>
				5,752 13
Buildings at Spot Pond Reservoir:				
Labor	.	.	.	\$1,188 25
Supplies and expenses	.	.	.	297 91
				<hr/>
				1,486 16
Low Service Pipe Lines:				
Labor	.	.	.	\$43,801 56
Supplies and expenses	.	.	.	6,551 83
				<hr/>
				50,353 39
Northern High Service Pipe Lines:				
Labor	.	.	.	\$11,911 18
Supplies and expenses	.	.	.	17,297 89
				<hr/>
				29,209 07
Northern Extra High Service Pipe Lines:				
Labor	.	.	.	\$156 19
Supplies and expenses	.	.	.	10 94
				<hr/>
				167 13
Southern High Service Pipe Lines:				
Labor	.	.	.	\$12,294 08
Supplies and expenses	.	.	.	1,463 23
				<hr/>
				13,757 31
Southern Extra High Service Pipe Lines:				
Labor	.	.	.	\$516 73
Supplies and expenses	.	.	.	10 97
				<hr/>
				527 70
Supply Pipe Lines:				
Labor	.	.	.	\$3,038 65
Supplies and expenses	.	.	.	4,301 29
				<hr/>
				7,339 94
Chestnut Hill Pipe Yard:				
Labor	.	.	.	\$1,959 18
Supplies and expenses	.	.	.	570 23
				<hr/>
				2,529 41
Glenwood Pipe Yard:				
Labor	.	.	.	\$2,392 50
Supplies and expenses	.	.	.	1,314 25
				<hr/>
				3,706 75
Stables and garages:				
Labor	.	.	.	\$3,892 74
Supplies and expenses	.	.	.	4,465 83
				<hr/>
				8,358 57
Venturi meters:				
Labor	.	.	.	\$1,825 30
Supplies and expenses	.	.	.	821 47
				<hr/>
				2,646 77
Measurement of water:				
Labor	.	.	.	\$4,071 48
Supplies and expenses	.	.	.	427 35
				<hr/>
				4,498 83
Arlington Pumping Station, buildings and grounds:				
Labor	.	.	.	\$1,245 59
Supplies and expenses	.	.	.	36 65
				<hr/>
				1,282 24

Metropolitan Water Maintenance Fund — General — Concluded

Hyde Park Station, buildings and grounds:			
Labor	\$557 16		
Supplies and expenses	69 50		
		\$626 66	
Chlorination, supplies		1,142 29	
Stock		14,301 77	
			\$230,239 59
Pumping Service:			
Superintendence:			
Labor	\$8,050 96		
Supplies and expenses	1,999 71		
		\$10,050 67	
Arlington Pumping Station:			
Labor	\$15,050 19		
Supplies and expenses	5,597 60		
		20,647 79	
Chestnut Hill Low Service Station, No. 2:			
Labor	\$52,398 14		
Supplies and expenses	36,963 12		
		89,361 26	
Chestnut Hill High Service Station, No. 1:			
Labor	\$31,282 02		
Supplies and expenses	23,209 73		
		54,491 75	
Spot Pond Pumping Station:			
Labor	\$18,459 57		
Supplies and expenses	16,355 22		
		34,814 79	
Hyde Park Pumping Station:			
Labor	\$11,322 50		
Supplies and expenses	2,456 29		
		13,778 79	
Booster pumping		7,507 85	
			230,652 90
			\$857,117 11
Balance, Dec. 1, 1927			\$42,592 21

METROPOLITAN WATER MAINTENANCE FUND — SPECIALS

NEW NORTHERN HIGH SERVICE PIPE LINES

Appropriation (Chapter 138, Acts of 1927, Item 712)	\$15,000 00
Expenditures	
Engineering:	
Services	\$5,039 46
Supplies and expenses	5 95
	5,045 41
Balance, Dec. 1, 1927	\$9,954 59

WESTON AND NEWTON SUPPLY MAIN

Appropriation (Chapter 138, Acts of 1927, Item 713)	\$15,000 00
Expenditures	
Engineering:	
Services	\$3,906 48
Supplies and expenses	120 59
	4,027 07
Balance, Dec. 1, 1927	\$10,972 93

HIGH DUTY ENGINE, ARLINGTON PUMPING STATION

Appropriation (Chapter 138, Acts of 1927, Item 716)	\$40,000 00
Expenditures	
Engineering:	
Services	\$1,147 68
Supplies and expenses	30
	\$1,147 98
Advertising	15 75
Printing	103 13
	1,266 86
Balance, Dec. 1, 1927	\$38,733 14

CHLORINATION OF WATER APPARATUS

Appropriation (Chapter 138, Acts of 1927, Item 717)	\$10,000 00
Expenditures	
Construction:	
Contract, Wallace & Tiernan, Inc.	\$1,815 00
Labor and materials	243 74
	\$2,058 74
Engineering:	
Services	681 54
	2,740 28
Balance, Dec. 1, 1927	\$7,259 72

Analysis of 1927 Receipts

Credited to:		
Metropolitan Water Construction Fund	.	\$2,387 60
Metropolitan Water Sinking Fund	.	129,071 23
Metropolitan Water Maintenance Fund	.	7,083 83
		<u>\$138,542 66</u>

Bonds, Sinking Funds and Net Debt

METROPOLITAN WATER CONSTRUCTION

Bonds issued:		
Sinking Fund:		
Year ending Nov. 30, 1927	.	-
Period prior to Dec. 1, 1926	.	\$41,398,000 00
		<u>\$41,398,000 00</u>
Serial Bonds:		
Year ending Nov. 30, 1927	.	-
Period prior to Dec. 1, 1926	.	\$4,287,000 00
		<u>4,287,000 00</u>
		\$45,685,000 00
Serial bonds paid:		
Year ending Nov. 30, 1927	.	\$115,000 00
Period prior to Dec. 1, 1926	.	622,000 00
		<u>737,000 00</u>
Bonds outstanding Dec. 1, 1927		\$44,948,000 00
Sinking Fund:		
Total, Dec. 1, 1927	.	\$24,740,068 20
Total, Dec. 1, 1926	.	23,571,873 99
Increase during 1927		<u>\$1,168,194 21</u>
Net Debt:		
Total, Dec. 1, 1927	.	\$20,207,931 80
Total, Dec. 1, 1926	.	21,491,126 01
Decrease during 1927		<u>\$1,283,194 21</u>

APPENDIX No. 1

CONTRACTS MADE AND PENDING DURING

	Contract Number	WORK	Number of Bids	Lowest
1	104	Furnish and set Bronze Lamp Posts, Brackets and Tablets for John W. Weeks Bridge.	6	\$12,204 00
2	105	Build Bridge over Dorchester Bay, Old Colony Parkway.	10	457,036 00
3	106	Grading and Surfacing, Broad Canal to Lechmere Sq., Northern Traffic Artery.	10	125,574 00
4	107	Surface Memorial Drive, Western Ave. to Boylston St., Cambridge Parkway.	7	12,270 00
5	108	Bascule Span of the Dorchester Bay Bridge.	3	102,600 00
6	109	Build Bridge and approaches over Charles River at Wales St. and Walnut St., Newton and Wellesley.	9	30,629 70
7	110 ¹	—	—	—
8	111	Grading and Surfacing, Stony Brook Reservation, River St. to Washington St.	7	56,727 50
9	112	Surface Memorial Drive, Western Ave. to Boylston St., Cambridge Parkway.	4	22,100 00
10	113	Grading and Surfacing, Blue Hill River Rd., Hillside St. to West St., Milton, Quincy, Braintree.	11	54,171 20
11	114	Repair Sea Wall at Northern Circle, Revere Beach Reserv.	7	3,937 50

¹ Not made up.

APPENDIX No. 1

THE YEAR 1927 — PARKS DIVISION

Contractor	Date of Contract	Date of Completion	Value of Work done Dec. 31, 1927
J. F. & T. F. McGann	Feb. 17, 1927	May 10, 1927	\$12,204 00
Aberthaw Company	June 9, 1927	—	99,425 00
James H. Fannon	July 14, 1927	Nov. 14, 1927	104,411 00
M. McDonough Co.	Rejected	—	—
American Bridge Co.	July 14, 1927	—	—
C. & R. Cons. Co.	Aug. 18, 1927	—	21,526 00
— — — — —	—	—	—
Coleman Bros.	Aug. 11, 1927	—	64,256 00
Simpson Bros.	July 28, 1927	Sept. 3, 1927	24,129 00
James H. Fannon	Aug. 22, 1927	—	33,400 00
Walsh & Co.	Sept. 22, 1927	Dec. 2, 1927	5,275 22

APPENDIX No. 2

CONTRACTS MADE AND PENDING DURING
[The details of Contracts made before

1	2	3	AMOUNT OF BID		6
			4	5	
Num- ber of Con- tract	WORK	Num- ber of Bids	Next to Lowest	Lowest	Contractor
54 ¹	Furnishing and laying 30-inch riveted steel water pipes in Boston, Cambridge, Waltham and Watertown.	4	\$101,471 00	\$79,855 00 ²	C. & R. Construction Co., Boston.
55 ¹	Furnishing water valves: 10 12-inch, 10 16-inch, 4 20-inch, 2 24-inch, 2 30-inch and 8 36-inch screw lift valves and 3 36-inch hydraulic lift valves.	6	38,603 00	27,575 00 ²	Feil Manufacturing Co., Chicago, Ill.
56	Furnishing and laying 54-inch riveted steel water pipes in Boston and Brookline.	14	259,630 00	248,745 00 ²	The Biggs Construction Co., Akron, Ohio.
57 ¹	Furnishing Chlorine Control Equipment for Chestnut Hill Reservoir.	—	— ³	— ³	Wallace & Tiernan Co., Inc., Newark, N. J.
58 ¹	Furnishing 77,000 pounds cast-iron frames and covers for gate chambers.	4	3.45 cents per pound	3.375 cents per pound ²	Barbour Stockwell Co., Cambridge, Mass.
59 ¹	Furnishing 185 tons cast-iron water pipe: 10 tons 4-inch, 20 tons 6-inch, 20 tons 8-inch, 20 tons 10-inch, 40 tons 12-inch, 50 tons 16-inch and 25 tons 30-inch.	1	—	9,678 50	United States Cast Iron Pipe & Foundry Co., Philadelphia, Pa.
60 ¹	Furnishing 210 tons of cast-iron special castings.	3	31,332 00	29,190 00 ²	Davis & Farnum Engineering Works, Inc., Waltham, Mass.
61	Pumping Engine for Arlington Pumping Station.	3	27,700 00	26,119 00 ²	Murray Iron Works Co., Burlington, Iowa.
62	Venturi Meter Tube and Meter Register.	—	— ³	— ³	Builders Iron Foundry, Providence, R. I.

¹ Contract completed.
² Contract based upon this bid.
³ Competitive bids were not received.

APPENDIX No. 2

THE YEAR 1927 — WATER DIVISION
1927 have been given in previous reports.]

7	8	9	10
Date of Contract	Date of Completion of Contract	Prices of Principal Items of Contracts	Value of Work done Dec. 31, 1927
July 20, 1926	Sept. 7, 1927	See annual report for 1926	\$90,046 51
Sept. 16, 1926	May 24, 1927	See annual report for 1926	35,314 32
Mar. 10, 1927	-	For furnishing and laying 54-inch riveted steel pipe, \$16.45 per lin. ft.; for laying 16-inch and 12-inch cast-iron pipes for blow-offs, \$2.50 per lin. ft.; for laying 6-inch cast-iron pipes for air inlets, \$1.50 per lin. ft.; for rock excavation above established grade, \$6.00 per cu. yd.; for rock excavation below established grade, \$7.00 per cu. yd.; for earth excavation below established grade of bottom of trench, \$2.00 per cu. yd.; for chambers for 36-inch valves, \$200 per chamber; for chambers for air valves, \$90 per chamber; for chambers for blow-off and by-pass valves, \$150 per chamber; for concrete masonry for foundations, anchorages and support for pipes, \$16 per cu. yd., for bituminous macadam resurfacing in streets, \$2.50 per sq. yd. .	275,175 25
Jan. 14, 1927	June 7, 1927	For Chlorine Control Equipment complete \$1,815.00	1,815 00
June 16, 1927	Nov. 30, 1927	For furnishing cast-iron frames and covers 3.375 cents per pound.	2,659 20
June 23, 1927	Sept. 15, 1927	For 4-inch straight pipe, \$56.10 per ton of 2,000 pounds; for 6-inch, 8-inch, 10-inch, 12-inch, 16-inch and 30-inch straight pipe, \$52.10 per ton of 2,000 pounds.	9,915 21
June 16, 1927	Nov. 30, 1927	For furnishing special castings, \$139.00 per ton of 2,000 pounds.	31,064 28
Dec. 1, 1927	-	For pumping engine with a capacity of 3 million U. S. gallons in 24 hours when operated at an average plunger speed of not over 250 feet per minute against a head of 305 feet, and that when operated at said rate and head on the duty trial it shall perform a duty of 138 million foot pounds for each 1,000 pounds of saturated steam supplied to the engine, \$26,119.	-
Sept. 17, 1927	-	For 36-inch by 15-inch Venturi meter tube, \$1,810; for special rust proof Type Y register-indicator recorder, \$695, with 2 per cent discount.	1,773 80

CONTRACTS MADE AND PENDING DURING

1 Num- ber of Con- tract	2 WORK	3 Num- ber of Bids	AMOUNT OF BID		6 Contractor
			4 Next to Lowest	5 Lowest	
21-M ¹	Sale and cutting of chestnut and miscellaneous standing timber on marginal lands of Wachusett Reservoir.	2	\$5,000 00 ²	\$9,750 00 ^{3, 4}	Wilder, Walker & Davis Co., Sterling, Mass.
30-M	Rewinding stator coils of Generator No. 4 at Wachusett Power Station.	—	— ⁵	— ⁵	Westinghouse Electric & Manufacturing Co., Boston.
51-M	Sale and purchase of electric energy to be developed at Wachusett Dam in Clinton.	1	—	\$5.30 per M kilowatt hours.	New England Power Company and Edison Electric Illuminating Company of Boston.
Agree- ment	Sale and purchase of electric energy to be developed at Sudbury Dam in Southborough.	— ⁶	— ⁶	— ⁶	Edison Electric Illuminating Company of Boston.

¹ Contract completed.
² Next to highest bid.
³ Contract based upon this bid.

THE YEAR 1927 — WATER DIVISION — *Continued*

7	8	9	10
Date of Contract	Date of Completion of Contract	Prices of Principal Items of Contracts	Value of Work done Dec. 31, 1927
Dec. 7, 1923	Mar. 25, 1927	See annual report for 1923	\$9,750 00
Oct. 13, 1927	—	For rewinding stator complete, \$4,592	—
Jan. 13, 1917	—	See annual report for 1917	384,137 29
Jan. 1, 1922	—	See annual report for 1922	188,687 70

⁴ Highest bid.
⁵ Competitive bids were not received.
⁶ Sale of energy continued since January 1, 1922, at same price as formerly under modified extension of Contract 39-M.

CONTRACTS MADE AND PENDING DURING THE YEAR 1927 — WATER DIVISION —
Concluded

Summary of Contracts, 1895 to 1927, inclusive ¹

	Value of Work done Dec. 31, 1927
Distribution Section, 8 contracts	\$447,763 57
Pumping Service, 1 contract	-
453 contracts completed from 1896 to 1926, inclusive	\$447,763 57 20,553,475 84
Deduct for work done on 11 Sudbury Reservoir contracts by the city of Boston	\$21,001,239 41 512,000 00
Total of 462 contracts	\$20,489,239 41

¹ In this summary contracts for the sale of used material and contracts charged to maintenance are excluded.

APPENDIX No. 3

TABLE No. 1. — Monthly Rainfall in Inches at Various Places on the Metropolitan Water Works, 1927

PLACE	January	February	March	April	May	June	July	August	September	October	November	December	Totals
Wachusett Watershed:													
Princeton	3.33	4.68	1.54	1.90	2.93	1.91	5.37	9.04	4.02	5.01	6.86	6.21	52.80
Jefferson	3.99	4.75	2.21	2.39	3.18	2.86	7.67	10.75	3.15	5.16	7.12	6.49	59.72
Sterling	2.86	4.44	1.51	2.13	2.89	1.71	4.57	8.57	3.61	4.46	7.00	5.96	49.71
Boylston	3.16	4.64	1.56	1.96	3.18	2.20	6.14	9.58	3.27	5.47	9.01	6.27	56.44
Sudbury Watershed:													
Sudbury Dam	3.00	3.45	1.40	2.24	3.09	2.48	3.98	9.07	3.57	5.37	8.06	5.51	51.22
Framingham	2.89	3.89	1.47	2.29	3.04	1.89	4.48	8.12	3.41	4.91	6.81	5.76	48.96
Ashland Dam	2.95	3.92	1.39	2.15	2.55	1.70	3.13	8.63	4.26	4.67	6.74	5.41	47.50
Cordaville	2.79	3.57	1.45	2.27	3.21	1.90	3.67	9.86	4.02	5.47	11.25	5.78	55.24
Lake Cochituate	3.16	3.94	1.45	2.18	3.37	2.05	5.02	8.04	4.18	4.61	4.62	5.60	48.22
Chestnut Hill Reservoir	2.85	3.68	1.43	1.58	3.06	2.20	5.11	7.82	2.71	4.09	5.51	5.49	45.53
Spot Pond	3.44	4.40	1.51	1.82	2.82	2.07	4.51	6.61	2.21	4.58	4.50	5.39	43.86
Average of all	3.13	4.12	1.54	2.08	3.03	2.09	4.88	8.74	3.49	4.89	7.04	5.81	50.84
Average, Wachusett Watershed	3.34	4.63	1.71	2.10	3.04	2.17	5.94	9.48	3.51	5.02	7.50	6.23	54.67
Average, Sudbury Watershed	2.91	3.71	1.43	2.24	2.97	1.99	3.82	8.92	3.82	5.10	8.21	5.61	50.73

TABLE NO. 2. — *Rainfall in Inches at Chestnut Hill Reservoir, 1927*

DATE	Amount	Duration	DATE	Amount	Duration
Jan. 4 . . .	.15	3.45 P.M. to	June 4 . . .	.62	6.15 P.M. to
Jan. 5 . . .		1.30 A.M.	June 5 . . .		2.15 A.M.
Jan. 10 . . .	.05 ¹	7.00 A.M. to 9.00 A.M.	June 5 . . .	.15	5.15 P.M. to 9.30 P.M.
Jan. 11 . . .	.83 ¹	12.45 A.M. to 9.20 P.M.	June 10 . . .	.08	10.00 P.M. to
Jan. 14 . . .	.52	10.00 A.M. to	June 11 . . .		1.45 A.M.
Jan. 15 . . .		7.00 A.M.	June 15 . . .	.26	12.30 P.M. to 4.00 P.M.
Jan. 15 . . .	.51 ²	7.00 A.M. to	June 19 . . .	.06	3.40 P.M. to 5.00 P.M.
Jan. 16 . . .		12.00 M.	June 20 . . .	.14	7.00 A.M. to 3.45 P.M.
Jan. 20 . . .	.45	3.45 P.M. to	June 23 . . .	.18	6.30 P.M. to
Jan. 22 . . .		7.00 A.M.	June 24 . . .		2.15 A.M.
Jan. 23 . . .	.12 ¹	3.40 P.M. to 11.30 P.M.	June 26 . . .	.23	5.30 A.M. to 6.40 P.M.
Jan. 28 . . .	.17	11.30 P.M. to	June 27 . . .	.15	7.30 P.M. to 10.45 P.M.
Jan. 29 . . .		7.00 A.M.	June 28 . . .	.33	8.40 P.M. to
Jan. 30 . . .	.05	11.45 A.M. to 1.10 P.M.	June 29 . . .		11.00 P.M.
Total . . .	2.85		Total . . .	2.20	
Feb. 3 . . .	.03	6.00 P.M. to 7.30 P.M.	July 1 . . .	.21	10.00 P.M. to
Feb. 6 . . .	.11 ¹	3.50 A.M. to 11.00 A.M.	July 3 . . .		7.30 A.M.
Feb. 11 . . .	.07 ¹	7.00 A.M. to 12.00 M.	July 3 . . .	.43	8.20 P.M. to 9.00 P.M.
Feb. 13 . . .	.87 ¹	9.10 P.M. to	July 7 . . .	.41	5.50 P.M. to
Feb. 14 . . .		10.30 P.M.	July 8 . . .		2.45 A.M.
Feb. 16 . . .	.17	5.30 P.M. to 11.00 P.M.	July 10 . . .	.32	4.10 A.M. to
Feb. 18 . . .	.37 ²	9.45 A.M. to 3.30 P.M.	July 11 . . .		7.00 A.M.
Feb. 19 . . .	1.23 ²	1.15 A.M. to	July 13 . . .	.02	6.35 P.M. to 7.30 P.M.
Feb. 21 . . .		7.30 A.M.	July 16 . . .	.64	5.15 P.M. to
Feb. 23 . . .	.08	6.40 A.M. to 8.30 A.M.	July 17 . . .		6.00 A.M.
Feb. 23 . . .	.05	10.00 P.M. to 11.00 P.M.	July 17 . . .	.32	8.05 A.M. to 9.15 A.M.
Feb. 26 . . .	.70	12.30 A.M. to 7.30 A.M.	July 18 . . .	.10	6.00 A.M. to 11.30 P.M.
Total . . .	3.68		July 22 . . .	.34	11.45 P.M. to
Mar. 6 . . .	.19	6.40 P.M. to	July 24 . . .		1.30 A.M.
Mar. 7 . . .		6.00 A.M.	July 27 . . .	.72	2.00 P.M. to 3.30 P.M.
Mar. 8 . . .	.23	2.50 A.M. to 12.45 P.M.	July 29 . . .	.19	6.25 A.M. to 7.00 A.M.
Mar. 14 . . .	.03	4.30 P.M. to 5.30 P.M.	July 29 . . .	.92	5.00 P.M. to 6.45 P.M.
Mar. 18 . . .	.06	4.00 A.M. to 7.10 P.M.	July 31 . . .	.49	6.00 A.M. to 9.30 P.M.
Mar. 20 . . .	.37 ¹	4.10 P.M. to 5.45 P.M.	Total . . .	5.11	
Mar. 20 . . .		5.45 P.M. to	Aug. 1 . . .	2.60	3.15 P.M. to
Mar. 21 . . .	.51	12.00 MIDNIGHT	Aug. 2 . . .		8.00 A.M.
Mar. 30 . . .		7.30 P.M. to 11.30 P.M.	Aug. 5 . . .	.03	5.00 P.M. to 5.15 P.M.
Total . . .	1.43		Aug. 8 . . .	.50	3.45 P.M. to
Apr. 5 . . .	32 ²	4.10 P.M. to	Aug. 9 . . .		7.15 A.M.
Apr. 6 . . .		4.30 A.M.	Aug. 9 . . .	.07	1.15 P.M. to 2.00 P.M.
Apr. 22 . . .	.23	12.45 A.M. to 5.30 A.M.	Aug. 14 . . .	.53	8.45 P.M. to
Apr. 22 . . .	.30	8.05 P.M. to	Aug. 15 . . .		2.30 A.M.
Apr. 23 . . .		4.30 A.M.	Aug. 18 . . .	.84	9.30 A.M. to
Apr. 25 . . .	.06	6.15 P.M. to 11.00 P.M.	Aug. 19 . . .		9.30 A.M.
Apr. 26 . . .	.10	8.25 P.M. to	Aug. 23 . . .	1.01	4.15 A.M. to
Apr. 27 . . .		3.15 A.M.	Aug. 24 . . .		2.45 P.M.
Apr. 27 . . .	.55	4.45 P.M. to	Aug. 27 . . .	2.24	4.30 A.M. to
Apr. 28 . . .		5.45 A.M.	Aug. 29 . . .		5.00 A.M.
Total . . .	1.58		Total . . .	7.82	
May 2 . . .	.05	11.45 A.M. to 2.45 P.M.	Sept. 1 . . .	1.39	7.15 A.M. to 10.30 P.M.
May 5 . . .	.29	12.10 A.M. to 11.30 A.M.	Sept. 11 . . .	1.00	2.00 A.M. to 4.45 P.M.
May 6 . . .	.03	12.30 A.M. to 2.30 A.M.	Sept. 15 . . .	.04	3.00 A.M. to 11.45 A.M.
May 9 . . .	.12	11.30 A.M. to	Sept. 19 . . .	.28	7.15 A.M. to
May 10 . . .		1.00 A.M.	Sept. 20 . . .		4.00 A.M.
May 10 . . .	.34	10.30 P.M. to	Total . . .	2.71	
May 11 . . .		3.30 A.M.	Oct. 4 . . .	.77	12.10 A.M. to 7.30 A.M.
May 11 . . .	.57	4.40 P.M. to 5.10 P.M.	Oct. 8 . . .	.18	2.10 A.M. to 11.00 A.M.
May 12 . . .	.05	8.00 P.M. to	Oct. 9 . . .	.70	8.30 A.M. to 8.30 P.M.
May 13 . . .		9.30 A.M.	Oct. 13 . . .	1.82	4.15 A.M. to 12.30 P.M.
May 15 . . .	.48	8.00 A.M. to	Oct. 17 . . .	.01	5.00 P.M. to 5.30 P.M.
May 16 . . .		10.45 P.M.	Oct. 18 . . .	.47	1.30 P.M. to
May 17 . . .	.02	3.15 P.M. to 3.35 P.M.	Oct. 19 . . .		10.00 A.M.
May 23 . . .	.30	11.15 A.M. to	Oct. 20 . . .	.14	1.15 P.M. to 10.00 P.M.
May 24 . . .		4.00 A.M.	Total . . .	4.09	
May 24 . . .	.02	10.15 A.M. to 2.30 P.M.			
May 25 . . .	.59	7.30 A.M. to			
May 26 . . .		1.00 A.M.			
May 27 . . .	.07	4.45 A.M. to 7.00 A.M.			
May 31 . . .	.13	11.10 P.M. to			
June 1 . . .		1.15 A.M.			
Total . . .	3.06				

¹ Snow.

² Rain and snow.

TABLE No. 2 — *Rainfall in Inches at Chestnut Hill Reservoir, 1927* — Concluded

DATE	Amount	Duration	DATE	Amount	Duration
Nov. 3 . .	2.24	1.15 A.M. to 7.15 A.M.	Dec. 2 . .	.99	12.30 P.M. to
Nov. 3 . .	.07	7.10 P.M. to	Dec. 3 . .		12.45 A.M.
Nov. 4 . .		11.15 A.M.	Dec. 4 . .	.95 ¹	3.30 P.M. to
Nov. 7 . .	.02 ¹	4.00 A.M. to 6.00 A.M.	Dec. 5 . .		2.00 P.M.
Nov. 11 . .	.07	12.15 A.M. to 7.45 A.M.	Dec. 8 . .	.83	3.20 A.M. to 11.15 A.M.
Nov. 17 . .	1.92	7.45 P.M. to	Dec. 11 . .	.25	3.45 P.M. to 11.15 P.M.
Nov. 18 . .		11.30 A.M.	Dec. 13 . .	.85	6.00 A.M. to
Nov. 24 . .	.70	1.00 P.M. to	Dec. 14 . .		9.00 A.M.
Nov. 25 . .		7.30 A.M.	Dec. 16 . .	1.05	5.30 A.M. to
Nov. 27 . .	.25	12.10 A.M. to 5.00 P.M.	Dec. 17 . .		12.30 A.M.
Nov. 28 . .	.24	6.00 P.M. to	Dec. 29 . .	.40	4.45 A.M. to 5.00 P.M.
Nov. 29 . .		7.15 A.M.	Dec. 31 . .	.17	11.45 A.M. to
			Jan. 1 . .		3.45 A.M.
Total . .	5.51		Total . .	5.49	

Total for year, 45.53 inches.
¹ Snow.

TABLE No. 3. — *Wachusett System — Statistics of Flow of Water, Storage and Rainfall in 1927*
[Watershed above dam = 108.84 square miles.]

MONTH	GALLONS PER DAY										Rainfall Col- lected (Inches)	Rainfall Col- lected (Inches)	Percent- age of Rainfall Col- lected
	Taken by Town of Clinton	Taken by City of Worcester	Received from City of Worcester Watershed	Discharged into Wachusett Aqueduct ¹	Wasted into River below Dam	Seepage through the North Dike ²	STORAGE ³		Total Yield of Water- shed	Yield per Square Mile			
							Gain	Loss					
January . . .	300,000	—	—	79,616,000	1,700,000	600,000	51,055,000	—	133,271,000	1,224,000	3.34	2.184	65.5
February . . .	—	—	—	96,293,000	1,732,000	600,000	21,925,000	—	120,550,000	1,108,000	4.63	1.784	38.6
March . . .	—	—	—	71,094,000	1,706,000	632,000	180,810,000	—	254,242,000	2,336,000	1.71	4.167	244.4
April . . .	—	—	—	151,040,000	1,716,000	668,000	—	48,044,000	105,380,000	968,000	2.10	1.669	79.7
May . . .	45,000	—	—	108,600,000	1,719,000	655,000	—	11,987,000	99,032,000	910,000	3.04	1.623	53.3
June . . .	133,000	—	—	130,130,000	1,717,000	644,000	—	85,837,000	46,787,000	430,000	2.17	0.742	34.2
July . . .	103,000	—	—	125,278,000	1,700,000	626,000	—	66,897,000	60,810,000	559,000	5.94	0.997	16.8
August . . .	442,000	—	—	96,339,000	1,719,000	623,000	76,322,000	—	175,445,000	1,612,000	9.48	2.875	30.3
September . . .	133,000	—	—	77,579,000	1,748,000	642,000	51,259,000	—	131,361,000	1,207,000	3.51	2.086	59.4
October . . .	—	—	—	75,152,000	1,693,000	658,000	42,813,000	—	120,316,000	1,105,000	5.02	1.972	39.2
November . . .	—	—	760,000	12,534,000	1,703,000	707,000	270,823,000	—	285,007,000	2,619,000	7.50	4.521	60.3
December . . .	—	—	7,532,000	41,719,000	1,713,000	790,000	241,032,000	—	277,723,000	2,552,000	6.23	4.552	73.0
Total Av. for Yr.	97,000	—	702,000	88,667,000	1,714,000	654,000	60,744,000	—	151,174,000	1,389,000	50.67 —	29.172 —	— 53.4

¹ Including 252,000 gallons per day drawn from aqueduct for the supply of the Westborough State Hospital.

² Estimated.

³ Aggregate storage in Wachusett Reservoir and in ponds and mill reservoirs.

TABLE No. 4. — *Sudbury System — Statistics of Flow of Water, Storage and Rainfall in 1927*

[Watershed = 75.2 square miles.]

MONTH	GALLONS PER DAY										Rain-fall Col-lected (Inches)	Rain-fall Col-lected (Inches)	Percent- age of Rainfall Col- lected	
	Water received from Wachusett Reservoir ¹	Water discharged through Sudbury Aqueduct	Water discharged through Weston Aqueduct	Water used by Fram- ingham Water Works	Water diverted from Water- shed by Sewers, etc.	Water wasted from Farm Pond	Water wasted into River below Lowest Dam	STORAGE		Total Yield of Watershed				Yield per Square Mile
								Gain	Loss					
Jan.	79,393,000	25,593,000	100,187,000	1,461,000	1,426,000	961,000	71,590,000	—	24,322,000	97,503,000	1,297,000	2.91	2.313	79.5
Feb.	96,061,000	28,382,000	101,078,000	1,396,000	1,518,000	1,182,000	66,871,000	5,546,000	—	109,914,000	1,462,000	3.71	2.355	63.5
Mar.	70,855,000	25,722,000	100,671,000	1,297,000	1,997,000	977,000	89,745,000	4,923,000	—	154,477,000	2,054,000	1.43	3.664	256.6
Apr.	150,800,000	26,266,000	100,093,000	1,175,000	1,015,000	104,000	31,367,000	42,656,000	—	52,076,000	692,000	2.24	1.194	53.3
May	108,348,000	25,345,000	98,352,000	1,187,000	823,000	103,000	31,452,000	8,809,000	—	57,723,000	768,000	2.97	1.369	46.1
June	129,897,000	31,603,000	100,290,000	1,460,000	543,000	47,000	13,544,000	—	1,453,000	16,137,000	215,000	1.99	0.370	18.6
July	125,023,000	25,100,000	99,229,000	1,603,000	606,000	—	6,736,000	1,526,000	—	9,777,000	130,000	3.82	0.232	6.1
Aug.	96,081,000	16,578,000	101,319,000	1,590,000	1,010,000	539,000	57,381,000	—	11,184,000	71,152,000	946,000	8.92	1.688	18.9
Sept.	77,299,000	18,628,000	102,654,000	1,531,000	1,218,000	246,000	66,414,000	—	15,069,000	98,323,000	1,307,000	3.82	2.260	59.3
Oct.	74,871,000	18,142,000	102,835,000	1,384,000	1,555,000	600,000	62,745,000	—	14,874,000	97,516,000	1,297,000	5.10	2.313	45.3
Nov.	12,273,000	12,337,000	103,807,000	1,320,000	2,366,000	1,083,000	202,023,000	—	7,910,000	302,753,000	4,026,000	8.21	6.950	84.6
Dec.	41,458,000	14,216,000	104,584,000	1,394,000	1,987,000	1,216,000	106,142,000	19,787,000	—	207,868,000	2,764,000	5.61	4.931	87.8
Total Av. for Yr.	88,475,000	22,277,000	101,255,000	1,400,000	1,338,000	585,000	67,068,000	614,000	—	106,122,000	1,411,000	50.73 —	29.639 —	— 58.4

¹ Not including 252,000 gallons per day drawn from the Wachusett Aqueduct for the supply of the Westborough State Hospital, which were not discharged into Sudbury Reservoir.

TABLE No. 5. — *Cochituate System — Statistics of Flow of Water, Storage and Rainfall in 1927*

[Watershed of lake = 17.58 square miles.¹]

MONTH	GALLONS PER DAY							Rainfall (Inches)	Rainfall Collected (Inches)	Percent- age of Rainfall Collected
	Water discharged through Cochituate Aqueduct	Water diverted from Water- shed by Sewers, etc.	Water wasted at Outlet of Lake	STORAGE		Total Yield of Water- shed	Yield per Square Mile			
				Gain	Loss					
January	6,861,000	1,091,000	21,716,000	—	5,674,000	23,994,000	1,365,000	3.16	2.43	77.1
February	—	1,286,000	21,403,000	4,011,000	—	26,700,000	1,519,000	3.94	2.45	62.1
March	—	1,532,000	24,868,000	2,510,000	—	28,910,000	1,644,000	1.45	2.93	202.3
April	—	1,011,000	6,139,000	4,429,000	—	11,579,000	659,000	2.18	1.14	52.1
May	—	874,000	8,290,000	1,613,000	—	10,777,000	613,000	3.37	1.09	32.5
June	1,803,000	383,000	1,006,000	—	1,346,000	1,847,000	105,000	2.05	0.18	8.8
July	9,090,000	52,000	—	—	3,445,000	5,697,000	324,000	5.02	0.58	11.5
August	11,471,000	529,000	3,239,000	4,442,000	—	19,681,000	1,119,000	8.04	2.00	24.8
September	12,136,000	1,448,000	10,935,000	—	2,613,000	21,906,000	1,246,000	4.18	2.15	51.5
October	12,835,000	1,203,000	6,871,000	—	535,000	20,374,000	1,159,000	4.61	2.07	44.8
November	13,023,000	1,587,000	13,077,000	1,426,000	—	29,113,000	1,656,000	4.62	2.86	61.9
December	13,197,000	1,864,000	30,239,000	—	4,206,000	41,094,000	2,338,000	5.60	4.17	74.5
Total	—	—	—	—	—	—	—	48.22	24.05	—
Average for year	6,757,000 ²	1,070,000	12,291,000	13,000	—	20,131,000	1,145,000	—	—	49.9

¹ Not including the watersheds of Dudley and Dug ponds.

² Includes 3,500 gallons wasted in flushing the aqueduct.

TABLE NO. 6. — Sources from which and Periods during which Water has been drawn for the Supply of the Metropolitan Water District
From Wachusett Reservoir into the Wachusett Aqueduct

MONTH	Number of Days during which Water was Flowing	ACTUAL TIME		Million Gallons Drawn
		Hours	Minutes	
January	25	265	45	2,468.1
February	23	231	0	2,696.2
March	27	275	0	2,203.9
April	25	307	0	4,524.9
May	25	265	45	3,366.6
June	26	264	0	3,903.9
July	25	274	15	3,883.6
August	27	275	0	2,986.5
September	22	225	30	2,330.6
October	25	247	30	2,329.7
November	3	33	0	376.0
December	21	220	0	1,293.3
Totals	274	120.16 days		32,363.3

From Sudbury Reservoir through the Weston Aqueduct to Weston Reservoir

MONTH	Number of Days during which Water was Flowing	ACTUAL TIME		Million Gallons Drawn
		Hours	Minutes	
January	31	654	31	3,105.8
February	28	593	0	2,830.2
March	31	661	45	3,120.8
April	30	649	56	2,998.6
May	31	652	50	3,048.9
June	30	628	0	3,008.7
July	31	645	21	3,076.1
August	31	630	57	3,140.9
September	30	615	37	3,083.9
October	31	633	07	3,187.9
November	30	604	55	3,114.2
December	31	632	47	3,242.1
Totals	365	316.78 days		36,958.1

From Framingham Reservoir No. 3 through the Sudbury Aqueduct to Chestnut Hill Reservoir

MONTH	Number of Days during which Water was Flowing	Actual Time (Hours)	Million Gallons Drawn
January	31	744	793.4
February	28	672	794.7
March	31	744	797.4
April	30	719 ¹	786.9
May	31	744	785.7
June	30	720	948.1
July	31	744	778.1
August	31	744	513.9
September	30	721 ¹	559.6
October	31	744	562.4
November	30	720	370.1
December	31	744	440.7
Totals	365	365 days	8,131.0

¹ Change for daylight saving time.

TABLE NO. 7. — *Average Daily Quantity of Water flowing through Aqueducts in 1927 by Months* ¹

MONTH						Wachusett Aqueduct into Sudbury Reservoir (Gallons)	Weston Aqueduct into Metropolitan District (Gallons)	Sudbury Aqueduct into Chestnut Hill Reservoir (Gallons)	Cochituate Aqueduct into Chestnut Hill Reservoir (Gallons)
January	.	.	.	.	.	79,393,000	100,187,000	25,593,000	6,861,000
February	.	.	.	.	.	96,061,000	101,078,000	28,382,000	—
March	.	.	.	.	.	70,855,000	100,671,000	25,722,000	—
April	.	.	.	.	.	150,800,000	100,093,000	26,266,000	—
May	.	.	.	.	.	108,348,000	98,352,000	25,345,000	—
June	.	.	.	.	.	129,897,000	100,290,000	31,603,000	1,803,000
July	.	.	.	.	.	125,023,000	99,229,000	25,100,000	9,090,000
August	.	.	.	.	.	96,081,000	101,319,000	16,578,000	11,471,000
September	.	.	.	.	.	77,299,000	102,654,000	18,628,000	12,136,000
October	.	.	.	.	.	74,871,000	102,835,000	18,142,000	12,835,000
November	.	.	.	.	.	12,273,000	103,807,000	12,337,000	13,023,000
December	.	.	.	.	.	41,458,000	104,584,000	14,216,000	13,197,000
Average	.	.	.	.	.	88,416,000	101,255,000	22,277,000	6,753,000

¹ Not including quantities wasted while cleaning and repairing aqueducts.

TABLE No. 8. — (Meter Basis.) Average Daily Consumption of Water by Districts in the Cities and Towns supplied by the Metropolitan Water Works in 1927

MONTH	LOW SERVICE	SOUTHERN HIGH SERVICE	SOUTHERN INTERMEDIATE HIGH SERVICE	NORTHERN HIGH SERVICE	SOUTHERN EXTRA HIGH SERVICE	NORTHERN EXTRA HIGH SERVICE	Total District Supplied	Estimated Population	Consumption per Inhabitant
	Portions of Arlington, Belmont, Boston, Chelsea, Everett, Malden, Medford, Somerville and Watertown	Quincy and Portions of Boston, Milton and Watertown	Portions of Belmont and Watertown	Melrose, Nahant, Revere, Swampscott and Winthrop and Portions of Boston, Chelsea, Everett, Malden, Medford and Somerville	Portions of Boston and Milton	Lexington and Portions of Arlington and Belmont			
January	78,035,800	45,367,200	1,632,100	10,896,700	1,239,700	1,106,300	138,277,800	1,335,320	104
February	74,948,200	44,127,300	1,608,700	10,728,400	1,230,000	1,086,900	133,729,500	1,336,860	100
March	71,028,000	42,892,400	1,668,700	10,787,600	1,255,800	1,119,000	128,751,500	1,338,400	96
April	70,600,400	42,147,800	1,725,900	10,937,100	1,316,700	1,233,000	127,960,900	1,339,940	95
May	70,386,000	41,682,400	1,624,000	10,940,300	1,267,000	1,209,700	127,109,400	1,341,480	95
June	71,351,300	45,084,100	1,661,100	11,959,800	1,516,000	1,456,900	133,029,200	1,343,020	99
July	73,290,700	44,213,600	1,103,900	12,099,100	1,463,100	1,369,300	133,539,700	1,344,560	99
August	72,222,500	44,835,300	1,005,700	12,022,200	1,405,100	1,182,300	132,673,100	1,346,100	99
September	71,807,400	47,738,300	1,133,300	12,044,400	1,321,800	1,326,500	135,371,700	1,347,640	100
October	72,710,100	46,776,100	1,128,400	11,710,800	1,269,600	1,319,800	134,914,800	1,349,180	100
November	71,489,900	45,307,200	1,099,400	10,951,300	1,224,900	1,242,400	131,315,100	1,350,720	97
December	72,240,400	46,526,900	1,092,900	10,977,500	1,180,600	1,226,300	133,244,600	1,352,260	99
For the year	72,502,400	44,725,900	1,371,400	11,341,400	1,307,800	1,240,300	132,489,200	1,344,560	99

TABLE No. 9. — (Meter Basis.) Average Daily Consumption of Water in Cities and Towns supplied by the Metropolitan Water Works in 1927

City or town	ARLINGTON		BELMONT		BOSTON		CHELSEA		EVERETT		LEXINGTON		MALDEN	
	GALLONS		GALLONS		GALLONS		GALLONS		GALLONS		GALLONS		GALLONS	
	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita
Population	26,940		16,680		797,870		48,460		42,700		8,230		52,760	
MONTH														
January	1,415,400	53	843,000	51	98,472,700	124	3,635,400	75	5,704,600	134	430,200	53	3,185,200	61
February	1,383,000	52	827,100	50	94,399,800	119	3,549,700	74	5,516,500	130	432,500	53	3,193,300	61
March	1,401,500	53	880,600	53	90,335,900	114	3,453,000	72	4,972,400	117	456,500	56	3,250,200	62
April	1,532,900	57	983,100	59	89,203,000	112	3,303,900	68	4,920,700	115	501,900	61	3,272,400	62
May	1,516,600	57	922,500	56	88,455,900	111	3,160,500	65	4,882,300	114	495,800	60	3,405,700	65
June	1,788,000	67	1,058,500	64	91,472,800	115	3,293,100	68	4,970,300	116	599,400	73	3,563,000	68
July	1,668,700	62	979,100	59	92,442,400	116	3,473,400	72	4,836,700	113	583,300	71	3,497,200	66
August	1,421,600	53	912,800	55	92,322,600	116	3,397,300	70	4,664,000	109	551,100	67	3,590,500	68
September	1,570,200	58	1,001,100	60	94,150,200	118	3,569,400	74	4,806,200	112	595,600	72	3,655,900	69
October	1,574,200	58	973,100	58	94,698,300	118	3,518,400	72	4,517,200	106	583,900	71	3,714,500	70
November	1,524,000	56	930,700	55	92,502,700	116	3,459,600	71	4,621,100	108	556,400	67	3,398,000	64
December	1,535,900	56	941,100	56	94,602,500	118	3,488,900	72	4,547,500	106	565,400	68	3,287,000	62
For the year	1,528,000	57	938,000	56	92,751,500	116	3,441,400	71	4,909,300	115	529,800	64	3,419,000	65

TABLE No. 9. — (Meter Basis). Average Daily Consumption of Water in Cities and Towns, etc. — Concluded

City or town	SOMERVILLE				STONEHAM				SWAMPSCOTT				WATERTOWN				WINTHROP				METROPOLITAN DISTRICT			
	MONTH		Per Day		Per Capita	Per Day		Per Capita	Per Day		Per Capita	Per Day		Per Capita	Per Day		Per Capita	Per Day		Per Capita	Per Day		Per Capita	GALLONS
Population	101,590			9,490			9,230			27,000			16,920			1,344,560						
			GALLONS			GALLONS			GALLONS			GALLONS			GALLONS			GALLONS						
January	8,197,400	81	57	538,200	53	59	538,500	87	87	2,313,100	87	87	1,027,400	61	61	138,277,800	104	104				
February	8,144,600	81	56	529,200	56	58	528,400	83	83	2,221,200	83	83	1,014,800	61	61	133,729,500	100	100				
March	7,925,500	78	60	568,300	60	58	533,300	81	81	2,171,100	81	81	1,087,500	65	65	128,751,500	96	96				
April	8,007,800	79	58	546,200	58	66	604,600	79	79	2,124,100	79	79	1,067,000	63	63	127,960,900	95	95				
May	7,986,400	79	50	471,500	50	74	681,800	83	83	2,242,900	83	83	1,035,300	61	61	127,109,400	95	95				
June	8,088,600	80	50	471,500	50	104	958,500	93	93	2,504,900	93	93	1,182,300	70	70	133,029,200	99	99				
July	8,063,600	79	49	469,500	49	99	911,500	85	85	2,282,000	85	85	1,317,300	78	78	133,539,700	99	99				
August	8,043,900	79	49	466,100	49	97	891,700	78	78	2,110,000	78	78	1,351,000	80	80	132,673,100	99	99				
September	8,135,600	80	49	463,000	49	90	830,500	83	83	2,261,100	83	83	1,200,500	71	71	135,371,700	100	100				
October	7,905,200	78	50	473,500	50	67	619,900	84	84	2,293,600	84	84	1,068,500	63	63	134,914,800	100	100				
November	7,385,800	72	50	479,100	50	61	565,800	86	86	2,336,700	86	86	991,200	58	58	131,315,100	97	97				
December	7,481,800	73	53	502,100	53	63	586,700	81	81	2,222,900	81	81	976,600	57	57	133,244,600	99	99				
For the year	7,946,000	78	52	498,000	52	75	688,300	84	84	2,256,700	84	84	1,110,700	66	66	132,489,200	99	99				

TABLE No. 10. — *Chemical Examinations of Water from the Wachusett Reservoir, Clinton*
[Parts per 100,000]

DATE OF COLLECTION	APPEARANCE		ODOR		RESIDUE ON EVAPO- RATION		AMMONIA			Chlorine	Hardness	
	Turbidity	Sediment	Cold	Hot	Total	Loss on Ignition	Free	ALBUMINOID				
								Total	Dissolved			Suspended
Jan. 4	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.60	1.80	.0014	.0104	.0086	.0018	.27	1.4
Jan. 18	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	4.75	2.00	.0010	.0120	.0106	.0014	.29	1.4
Feb. 8	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.65	1.50	.0020	.0132	.0104	.0028	.28	1.1
Feb. 21	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.95	1.60	.0020	.0100	.0096	.0004	.30	1.3
Mar. 8	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	4.10	1.50	.0042	.0122	.0094	.0028	.27	1.6
Mar. 22	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.90	1.45	.0022	.0104	.0078	.0026	.26	1.4
Apr. 5	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.70	1.30	.0032	.0108	.0098	.0010	.27	1.3
Apr. 18	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.65	1.20	.0020	.0112	.0098	.0014	.28	1.6
May 3	V. slight.	Slight.	V. faintly vegetable.	Faintly vegetable.	3.70	1.35	.0014	.0114	.0108	.0006	.25	1.3
May 17	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.80	1.45	.0018	.0114	.0104	.0010	.24	1.3
June 7	V. slight.	V. slight.	Faintly vegetable.	Distinctly vegetable.	3.70	1.30	.0012	.0124	.0098	.0026	.27	1.1
June 21	V. slight.	V. slight.	Faintly vegetable.	Distinctly vegetable.	3.30	1.25	.0024	.0100	.0082	.0018	.28	0.6
July 6	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.70	1.30	.0012	.0120	.0098	.0022	.24	1.1
July 19	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.60	1.35	.0022	.0144	.0120	.0024	.26	1.3
Aug. 1	None	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.75	1.40	.0036	.0130	.0120	.0010	.27	1.1
Aug. 16	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.15	1.25	.0014	.0130	.0100	.0030	.24	1.6
Sept. 7	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.95	1.65	.0010	.0130	.0104	.0026	.24	1.1
Sept. 21	V. slight.	V. slight.	Faintly vegetable.	Distinctly vegetable.	3.85	1.35	.0038	.0142	.0122	.0020	.24	1.0
Oct. 5	None.	V. slight.	Faintly vegetable.	Distinctly vegetable.	3.60	1.50	.0008	.0122	.0082	.0040	.23	1.0
Oct. 19	None.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.70	1.30	.0018	.0118	.0100	.0018	.25	1.3
Nov. 2	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.60	1.30	.0014	.0112	.0092	.0020	.25	1.4
Nov. 16	V. slight.	V. slight.	Faintly vegetable.	Distinctly vegetable.	3.60	1.30	.0028	.0084	.0074	.0010	.27	1.1
Dec. 6	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.45	1.25	.0024	.0138	.0114	.0024	.26	1.0
Dec. 20	None.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.80	1.50	.0022	.0108	.0092	.0016	.28	1.0
Av.	.....	.....	.....	.....	3.77	1.42	.0021	.0118	.0099	.0019	.26	1.2

TABLE No. 11. — *Chemical Examinations of Water from the Sudbury Reservoir.*
[Parts per 100,000.]

DATE OF COLLECTION	APPEARANCE		ODOR		RESIDUE ON EVAPO- RATION		AMMONIA			Chlorine	Hardness	
	Turbidity	Sediment	Cold	Hot	Total	Loss on Ignition	Free	ALBUMINOID				
								Total	Dissolved			Suspended
Jan. 4	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.25	1.70	.0012	.0110	.0094	.0016	.28	1.7
Feb. 8	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	3.95	1.55	.0032	.0156	.0112	.0044	.32	1.6
Mar. 8	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	5.50	1.90	.0022	.0128	.0108	.0020	.31	1.7
Apr. 5	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.20	1.60	.0018	.0138	.0120	.0018	.30	1.6
May 3	V. slight.	Slight.	Faintly vegetable.	Distinctly vegetable.	3.85	1.45	.0024	.0140	.0134	.0006	.32	1.4
June 6	V. slight.	V. slight.	Faintly vegetable.	Distinctly vegetable.	3.95	1.40	.0020	.0152	.0128	.0024	.34	1.1
July 5	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.55	1.30	.0012	.0134	.0098	.0036	.29	1.4
Aug. 2	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.75	1.50	.0012	.0124	.0108	.0016	.30	1.3
Sept. 6	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.80	1.50	.0006	.0132	.0108	.0024	.28	1.4
Oct. 4	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.25	1.70	.0018	.0142	.0116	.0026	.32	1.6
Nov. 1	V. slight.	V. slight.	Faintly vegetable.	Distinctly vegetable.	4.15	1.65	.0036	.0140	.0112	.0028	.31	1.6
Dec. 6	V. slight.	V. slight.	Faintly vegetable.	Distinctly vegetable.	4.20	1.70	.0036	.0136	.0128	.0008	.34	1.7
Av.	.....	.....	.....	.....	4.12	1.58	.0021	.0136	.0114	.0022	.31	1.5

TABLE No. 12. — *Chemical Examinations of Water from Spot Pond, Stoneham.*
[Parts per 100,000.]

Jan. 3	V. slight.	V. slight.	V. faintly unpl. and fishy.	Faintly unpl. and fishy.	4.60	1.80	.0018	.0128	.0116	.0012	.30	1.6
Feb. 7	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.70	1.50	.0028	.0108	.0098	.0010	.32	1.6
Mar. 7	V. slight.	None.	V. faintly vegetable.	Faintly vegetable.	3.95	1.50	.0044	.0132	.0108	.0024	.34	1.7
Apr. 4	V. slight.	V. slight.	V. faintly unpl. and fishy.	Faintly unpl. and fishy.	4.50	1.70	.0016	.0122	.0120	.0002	.33	1.4
May 2	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.70	1.25	.0018	.0136	.0120	.0016	.32	1.7
June 6	V. slight.	Slight.	V. faintly vegetable.	Faintly vegetable.	4.05	1.50	.0012	.0150	.0126	.0024	.32	1.4
July 5	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	3.65	1.30	.0002	.0124	.0104	.0020	.33	1.4
Aug. 1	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	3.95	1.60	.0012	.0110	.0082	.0028	.33	2.0
Sept. 6	V. slight.	V. slight.	V. faintly veg. and sweetish.	Faintly veg. and sweetish.	4.25	1.50	.0008	.0140	.0106	.0034	.28	1.6
Oct. 3	None.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.55	1.80	.0012	.0128	.0118	.0010	.30	1.3
Dec. 5	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.20	1.70	.0036	.0110	—	—	.31	1.6
Av.	.....	.....	.....	.....	4.10	1.56	.0019	.0126	.0110	.0018	.32	1.6

TABLE No. 13. — Chemical Examinations of Water from Lake Cochituate.
[Parts per 100,000.]

DATE OF COLLECTION	APPEARANCE		ODOR		RESIDUE ON EVAPO- RATION		AMMONIA			Chlorine	Hardness	
	Turbidity	Sediment	Cold	Hot	Total	Loss on Ignition	Free	ALBUMINOID				
								Total	Dissolved			Suspended
Jan. 6	V. slight.	Slight.	Faintly veg. and marshy.	Distinctly veg. and marshy.	8.20	2.65	.0038	.0206	.0152	.0054	.83	3.0
Feb. 10	V. slight.	V. slight.	Faintly unpl. and marshy.	Distinctly unpl. and earthy.	8.05	3.00	.0072	.0198	.0142	.0056	.85	3.1
Mar. 9	V. slight.	V. slight.	Faintly veg. and earthy.	Distinctly veg. and earthy.	7.45	2.50	.0042	.0164	.0124	.0040	.80	3.4
Apr. 6	V. slight.	Slight.	Faintly veg. and earthy.	Distinctly veg. and earthy.	7.55	2.45	.0016	.0154	.0126	.0028	.80	3.1
May 2	V. slight.	V. slight.	Faintly veg. and earthy.	Distinctly veg. and earthy.	7.20	2.45	.0024	.0188	.0148	.0040	.78	3.0
June 8	V. slight.	Slight.	Faintly vegetable.	Distinctly vegetable.	6.75	2.35	.0012	.0188	.0160	.0028	.85	2.7
July 5	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	6.95	2.10	.0010	.0174	.0124	.0050	.82	2.9
Aug. 2	V. slight.	V. slight.	V. faintly vegetable and unpl.	Faintly vegetable and unpl.	6.75	2.00	.0002	.0172	.0160	.0012	.78	2.7
Sept. 7	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	7.55	2.30	.0012	.0166	.0128	.0038	.86	2.7
Nov. 2	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	7.35	2.50	.0034	.0116	.0114	.0002	.88	3.1
Dec. 7	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	7.25	2.40	.0060	.0144	.0134	.0010	.90	2.7
Av.					7.37	2.43	.0029	.0170	.0137	.0033	.83	2.9

TABLE No. 14. — Chemical Examinations of Water from a Tap at the State House, Boston.
[Parts per 100,000.]

Jan. 4	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	4.50	1.90	.0010	.0104	.0100	.0004	.33	2.0
Feb. 7	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.05	1.60	.0024	.0122	.0108	.0014	.34	1.6
Mar. 9	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.35	1.70	.0028	.0132	.0104	.0028	.34	1.7
Apr. 4	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	4.10	1.65	.0032	.0106	.0082	.0024	.33	1.6
May 2	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.30	1.60	.0018	.0126	.0104	.0022	.31	1.7
June 6	V. slight.	Slight.	V. faintly vegetable.	Faintly vegetable.	3.85	1.40	.0006	.0130	.0112	.0018	.30	1.6
July 5	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	3.45	1.00	.0008	.0114	.0092	.0022	.28	1.3
Aug. 1	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.05	1.70	.0008	.0094	.0080	.0014	.34	1.8
Sept. 6	None.	None.	None.	—	6.90	—	.0000	.0020	—	—	.22	3.5
Oct. 3	V. slight.	V. slight.	Faintly vegetable.	Distinctly vegetable.	4.85	1.75	.0008	.0134	.0116	.0018	.36	1.7
Nov. 1	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.00	1.55	.0008	.0116	.0104	.0012	.33	2.0
Dec. 6	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	5.25	2.00	.0010	.0128	.0106	.0022	.58	2.1
Av.					4.47	1.62	.0013	.0111	.0101	.0018	.34	1.9

TABLE No. 15. — *Chemical Examinations of Water from a Faucet in Boston, 1898-1927.*

[Parts per 100,000.]

YEAR	COLOR	RESIDUE ON EVAPORATION		AMMONIA				Chlorine	Oxygen Consumed	Hardness
	Platinum Standard	Total	Loss on Ignition	Free	ALBUMINOID					
					Total	Dissolved	Suspended			
1898	.40	4.19	1.60	.0008	.0152	.0136	.0016	.29	.44	1.4
1899	.28	3.70	1.30	.0006	.0136	.0122	.0014	.24	.35	1.1
1900	.29	3.80	1.20	.0012	.0157	.0139	.0018	.25	.38	1.3
1901	.29	4.43	1.64	.0013	.0158	.0142	.0016	.30	.42	1.7
1902	.30	3.93	1.56	.0016	.0139	.0119	.0020	.29	.40	1.3
1903	.29	3.98	1.50	.0013	.0125	.0110	.0015	.30	.39	1.5
1904	.23	3.93	1.59	.0023	.0139	.0121	.0018	.34	.37	1.5
1905	.24	3.86	1.59	.0020	.0145	.0124	.0021	.35	.35	1.4
1906	.24	3.86	1.39	.0018	.0159	.0134	.0025	.34	.36	1.3
1907	.22	3.83	1.40	.0013	.0129	.0109	.0020	.33	.32	1.3
1908	.19	3.50	1.35	.0011	.0115	.0092	.0024	.33	.26	1.2
1909	.18	3.46	1.43	.0011	.0128	.0103	.0025	.28	.25	1.3
1910	.14	3.05	1.24	.0013	.0118	.0102	.0016	.28	.22	1.1
1911	.25	4.18	1.66	.0015	.0156	.0128	.0029	.38	.33	1.4
1912	.17	3.86	1.23	.0018	.0154	.0119	.0034	.36	.29	1.7
1913	.13	3.96	1.15	.0014	.0150	.0120	.0026	.35	.26	1.5
1914	.14	4.12	1.19	.0014	.0138	.0116	.0022	.39	.25	1.4
1915	.16	3.73	1.04	.0015	.0157	.0134	.0023	.38	.25	1.4
1916	.18	4.53	1.85	.0013	.0133	.0107	.0026	.36	—	1.4
1917	.15	4.45	1.68	.0015	.0142	.0124	.0018	.33	—	1.3
1918	.18	3.89	1.45	.0019	.0154	.0128	.0026	.29	—	1.4
1919	.20	4.28	1.41	.0010	.0130	.0108	.0022	.36	—	1.5
1920	.17	4.23	1.35	.0012	.0112	.0097	.0014	.33	—	1.5
1921	.13	3.80	1.39	.0006	.0104	.0089	.0015	.25	—	1.4
1922	.16	3.98	1.55	.0011	.0097	.0080	.0017	.30	—	1.8
1923	.15	3.90	1.45	.0011	.0100	.0090	.0010	.26	—	1.5
1924	.12	4.10	1.60	.0011	.0109	.0084	.0025	.28	—	1.5
1925	.09	3.98	1.62	.0013	.0109	.0093	.0016	.29	—	1.5
1926	.10	4.18	1.68	.0015	.0115	.0092	.0023	.32	—	1.5
1927	.22	4.47	1.62	.0013	.0111	.0101	.0018	.34	—	1.9

TABLE No. 16. — *Number of Bacteria per Cubic Centimeter in Water from Various Parts of the Metropolitan Water Works, 1898-1927. (Averages of Weekly Determinations.)*

YEAR	CHESTNUT HILL RESERVOIR			SOUTHERN SERVICE TAPS	
	Sudbury Aqueduct Terminal Chamber	Cochituate Aqueduct	Effluent Gate-house No. 2	Low Service, 180 Boylston Street	High Service, 1 Ashburton Place
1898	207	145	111	96	—
1899	224	104	217	117	123
1900	248	113	256	188	181
1901	225	149	169	162	168
1902	203	168	121	164	246
1903	76	120	96	126	243
1904	347	172	220	176	355
1905	495	396	489	231	442
1906	231	145	246	154	261
1907	147	246	118	130	176
1908	162	138	137	136	148
1909	198	229	119	150	195
1910	216	—	180	178	213
1911	205	204	151	175	197
1912	429	450	227	249	259
1913	123	243	157	119	140
1914	288	—	252	174	220
1915	163	—	128	117	134
1916	128	—	85	102	105
1917	178	112	119	119	141
1918	1,163	168	705	317	544
1919	92	85	100	70	84
1920	148	86	108	113	112
1921	103	—	83	92	92
1922	163	—	153	160	172
1923	229	—	178	217	230
1924	137	—	96	150	160
1925	144	251	120	155	174
1926	167	—	118	130	137
1927	119	185	70	81	101

TABLE No. 17. — Colors of Water from Various Parts of the Metropolitan Water Works in 1927. (Averages of Weekly Determinations.)

[Platinum Standard]

MONTH	WACHUSETT RESERVOIR						SUDBURY RESERVOIR				FRAM- INGHAM RESER- VOIR No. 3	LAKE COCHITUATE			CHESTNUT HILL RESERVOIR			SPOT POND	FELLS RESER- VOIR	NORTHERN SERVICE		SOUTHERN SERVICE	
	Surface	Mid-depth	Bottom	Worcester St. Bridge	Quinapoxet River	Stillwater River	Surface	Mid-depth	Bottom	End of Open Channel		Surface	Mid-depth	Bottom	Inlet (Sudbury Aqueduct)	Inlet (Cochituate Aqueduct)	Effluent Gate-house No. 2	Mid-depth	Effluent Gate-house	Tap at Glenwood Yard, Medford (Low Serv- ice)	Tap at Glenwood Yard, Medford (High Serv- ice)	Tap at 180 Boylston Street, Boston (Low Service)	Tap at 1 Ashburton Place, Boston (High Service)
January	14	14	14	47	57	42	16	15	17	15	18	17	17	17	16	-	16	13	13	15	13	15	15
February	18	17	16	36	49	36	21	22	20	22	24	29	-	-	22	-	19	13	13	19	13	19	19
March	23	22	20	41	56	40	22	35	23	35	26	30	-	-	23	-	20	14	13	20	13	20	20
April	21	21	21	43	57	44	25	25	25	23	26	26	-	-	24	-	22	13	13	23	13	23	23
May	18	18	18	47	64	45	19	19	19	19	22	20	27	24	20	-	19	12	12	19	12	19	19
June	18	18	18	41	55	37	19	19	19	19	19	19	20	27	20	-	18	12	11	18	12	19	19
July	17	17	17	54	72	43	17	17	17	17	18	18	-	-	18	17	16	11	11	17	11	17	17
August	16	17	14	25	81	68	17	17	16	54	17	17	-	-	17	17	14	11	11	16	12	16	16
September	21	19	19	74	97	79	21	20	24	63	22	19	-	-	20	19	16	12	12	18	12	18	18
October	23	24	24	58	103	71	28	28	28	35	24	22	-	-	23	20	19	14	13	27	13	27	24
November	26	26	25	50	93	59	34	36	33	166	36	26	-	-	32	26	23	14	15	32	15	32	29
December	28	28	28	51	55	41	48	48	47	50	45	36	-	-	42	33	28	16	17	41	17	41	38
Mean	20	20	19	47	70	50	24	24	24	43	25	23	19	24	23	22	19	13	13	22	13	22	21

TABLE No. 18. — *Temperatures of Water from Various Parts of the Metropolitan Water Works in 1927. (Averages of Weekly Determinations.)*

[The temperatures are taken at the same places and times as the samples for microscopical examination; the depth at place of observation is from high-water mark.]
[Degrees Fahrenheit.]

MONTH	WACHUSETT ¹ RESERVOIR (DEPTH AT PLACE OF OBSERVATION 107 FEET)			SUDBURY ¹ RESERVOIR (DEPTH AT PLACE OF OBSERVATION 54.5 FEET)			WACHU- SETT AQUE- DUCT			FRAMINGHAM ¹ RESERVOIR No. 3 (DEPTH AT PLACE OF OBSERVATION 20.5 FEET)			LAKE COCHITUATE ¹ (DEPTH AT PLACE OF OBSERVATION 62.0 FEET)			CHEST- NUT HILL RESER- VOIR			SPOT POND ¹ (DEPTH AT PLACE OF OBSERVATION 28.0 FEET)			NORTHERN SERVICE		SOUTHERN SERVICE	
	Surface	Mid-depth	Bottom	Surface	Mid-depth	Bottom	End of Open Channel			Surface	Mid-depth	Bottom	Surface	Mid-depth	Bottom	Effluent Gate-house No. 2			Surface	Mid-depth	Bottom	Tap at Glenwood Yard, Medford (Low Serv- ice)	Tap at Glenwood Yard, Medford (High Serv- ice)	Tap at 180 Boylston Street, Boston (Low Service)	Tap at 1 Ashburton Place, Boston (High Service)
January	33.5	34.8	35.8	34.4	35.3	36.8	33.0	33.3	33.8	34.3	35.8	36.1	35.1	36.2	36.6	37.1	37.4	37.1	35.8	37.5	36.5	38.1	40.3	38.0	40.6
February	33.8	34.9	36.4	34.5	36.5	37.5	35.3	35.7	37.5	35.4	36.7	36.7	36.9	—	—	37.4	37.4	37.4	36.9	37.0	37.3	37.1	41.0	38.4	40.5
March	35.5	36.2	36.9	36.6	37.5	38.3	37.5	37.5	38.8	38.6	39.7	39.1	38.8	—	—	40.2	40.2	40.2	38.8	39.3	39.3	40.4	41.9	40.8	42.7
April	41.9	43.0	40.3	46.8	47.0	43.8	43.0	43.0	43.8	47.1	45.0	48.0	46.5	—	43.5	46.5	46.5	46.5	45.0	44.0	46.3	47.9	45.9	46.7	48.7
May	49.9	50.3	49.8	54.9	54.5	53.3	51.5	51.5	53.3	56.4	56.2	55.8	55.7	51.4	47.3	55.8	55.8	55.8	54.5	54.7	54.3	55.1	52.7	55.2	57.5
June	63.2	56.8	54.3	66.3	63.2	60.8	59.7	59.7	60.8	66.6	67.4	64.0	66.8	59.6	51.0	63.0	63.0	63.0	65.4	66.8	60.8	62.4	58.6	65.0	66.9
July	70.6	62.3	57.3	72.1	69.5	65.3	68.4	68.4	65.3	72.6	72.1	69.8	75.3	—	—	71.0	71.0	71.0	70.9	70.8	68.3	69.1	62.6	71.0	72.0
August	68.0	60.0	57.5	68.3	69.5	64.0	66.5	66.5	64.0	68.1	69.5	66.5	69.3	—	—	68.0	68.0	68.0	67.8	69.0	66.5	68.5	63.8	68.8	69.5
September	66.6	62.5	55.8	67.3	67.3	65.5	65.4	65.4	65.5	66.7	67.8	65.3	67.6	—	—	67.4	67.4	67.4	67.1	68.0	66.3	68.0	64.1	68.6	69.4
October	60.2	59.5	61.5	61.3	63.3	60.3	59.6	59.6	60.3	60.1	61.8	58.3	60.9	—	—	61.6	61.6	61.6	61.3	59.8	62.3	65.6	61.9	63.8	64.1
November	51.9	51.3	51.8	50.6	50.0	49.8	46.0	46.0	49.8	48.5	48.6	47.6	51.0	—	—	50.3	50.3	50.3	49.9	50.5	49.5	54.1	52.0	52.1	54.1
December	39.9	41.5	38.0	39.4	37.5	43.0	38.1	38.1	43.0	36.9	37.0	38.5	39.9	—	—	38.4	38.4	38.4	37.0	41.5	37.5	45.3	48.0	40.5	43.7
Mean	51.3	49.4	48.0	52.7	52.6	51.5	50.3	50.3	51.5	52.6	53.1	52.1	53.5	49.1	44.6	53.1	53.1	53.1	52.5	53.2	52.1	54.3	52.7	54.1	55.8

¹ Surface temperatures are averages of weekly determinations. Mid-depth and bottom temperatures are averages of biweekly determinations.

TABLE No. 19. — Length of Metropolitan Water Works Main Lines and Connections and Number of Valves set in Same, Dec. 31, 1927

[Pipes are of cast iron unless otherwise noted.]

	DIAMETER OF PIPES IN INCHES																		Total
	60	56	54	48	42	40	38	36	30	24	20	16	14	12	10	8	6	4	
Total length owned and operated Dec. 31, 1926 (feet) .	81,337	17,569	—	215,562	9,810	6,887	7,274	63,771	58,813	96,073	102,357	76,351	26	29,416	3,859	1,900	1,282	46	772,333
Gate valves in same .	12	—	—	57	1	3	—	62	47	68	64	108	1	129	22	21	25	1	621
Air valves in same .	110	8	—	127	5	5	6	47	29	55	66	40	—	10	1	—	—	—	509
Length laid or relaid during 1927 (feet)	—	—	13,133	—	—	—	—	162	—	2	—	192	—	93	8	—	—	—	13,590
Gate valves in same .	—	—	5	—	—	—	—	7	—	—	—	7	—	3	—	—	—	—	22
Air valves in same .	—	—	12	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	13
Length abandoned during 1927 (feet)	—	—	—	—	—	—	—	30	—	—	—	16	—	—	—	—	—	—	46
Gate valves in same .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Air valves in same .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Length owned and operated Dec. 31, 1927 (feet) .	81,337 ¹	17,569 ²	13,133 ²	215,562	9,810	6,887	7,274 ²	63,903	58,813 ³	96,075	102,357 ⁴	76,527 ⁵	26	29,509 ⁶	3,867	1,900	1,282	46	785,877 ⁷
Gate valves in same .	12	—	5	57	1	3	—	69	47	68	64	115	1	132	22	21	25	1	643
Air valves in same .	110	8	12	127	5	5	6	48	29	55	66	40	—	10	1	—	—	—	522

¹ Includes 2,035 feet of 76-inch concrete-lined pressure tunnel; 363 feet of 76-inch mortar-lined and concrete-covered steel pipe; 21 feet of 76-inch cast-iron pipe; 85 feet of 60-inch concrete-covered steel pipe and 34,037 feet of 60-inch steel pipe.
² Steel pipe.
³ Includes 15,512 feet of mortar-lined and covered wrought-iron pipe and 7,213 feet of cement-lined cast-iron pipe.
⁴ Includes 1,319 feet of cement-lined cast-iron pipe.
⁵ Includes 1,795 feet of cement-lined cast-iron pipe.
⁶ Includes 627 feet of cement-lined cast-iron pipe.
⁷ 148.84 miles.

TABLE No. 20. — *Length of Metropolitan Water Works Hydrant, Blow-off and Drain Pipes, Dec. 31, 1927*

[All pipes are of cast iron.]

	DIAMETER OF PIPES IN INCHES								Total
	24	20	16	12	10	8	6	4	
Total length in use Dec. 31, 1926 (feet)	352	292	3,573	6,990	220	1,071	4,160	1,640	18,298
Valves in same	—	—	44	114	2	12	99	48	319
Length laid or relaid in 1927 (feet)	—	—	63	63	—	—	—	—	126
Valves in same	—	—	—	—	—	—	—	—	—
Length abandoned in 1927 (feet)	—	—	—	—	—	—	—	—	—
Valves in same	—	—	—	—	—	—	—	—	—
Total length in use Dec. 31, 1927 (feet)	352	292	3,636	7,053	220	1,071	4,160	1,640	18,424 ¹
Valves in same	—	—	44	114	2	12	99	48	319

¹ 3.49 miles.

TABLE No. 21. — Length of Metropolitan Water Works Main Lines and Connections and Water Pipes, Four Inches in Diameter and Larger, in the Several Cities and Towns in the Metropolitan Water District, Dec. 31, 1927

By Whom Owned	INCHES																TOTALS					
	60	56	54	48	42	40	38	36	30	24	20	18	16	14	12	10	8	7	6	4	Feet	Miles
Met. W. Wks. . .	81,337	17,569	13,133	215,562	9,810	6,887	7,274	63,903	58,813	96,075	102,357	—	76,527	26	29,509	3,867	1,900	—	1,282	46	785,877	148.84
Arlington . . .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	34,858	32,613	49,733	—	229,616	15,290	362,110	68.58
Belmont . . .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10,522	25,009	47,035	—	175,111	269	257,946	48.85
Boston . . .	—	—	—	20,568	15,980	16,081	—	43,784	90,399	84,436	86,741	—	290,796	5,041	1,629,494	446,390	984,880	—	1,123,726	83,336	4,921,652	932.13
Brookline . . .	—	—	—	—	—	—	—	—	—	10,007	27,292	—	20,057	13,020	61,142	73,366	92,986	—	256,761	—	554,631	105.04
Chelsea . . .	—	—	—	—	—	—	—	—	—	—	—	—	5,176	—	5,479	40,131	32,802	—	149,157	6,747	239,492	45.36
Everett . . .	—	—	—	—	—	—	—	—	—	2,484	2,900	—	6,948	5,998	8,306	44,713	28,535	—	167,158	29,190	296,232	56.10
Lexington . . .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9,701	5,521	38,919	—	170,030	27,890	252,061	47.74
Malden . . .	—	—	—	—	—	—	—	—	—	—	—	—	8,891	11,118	89,822	32,544	105,701	—	235,156	50,201	533,433	101.03
Medford . . .	—	—	—	—	—	—	—	—	—	—	673	—	6,775	9,598	40,356	44,387	116,395	—	234,089	25,928	478,201	90.57
Melrose . . .	—	—	—	—	—	—	—	—	—	—	—	—	5,223	3,024	23,097	20,903	28,641	—	179,194	53,292	313,374	59.35
Milton . . .	—	—	—	—	—	—	—	—	—	—	—	—	3,415	72	35,259	24,024	74,214	—	205,151	17,618	359,753	68.14
Nahant . . .	—	—	—	—	—	—	—	—	—	—	—	—	—	10,444	5,550	11,550	6,642	—	37,942	57,668	129,796	24.58
Newton . . .	—	—	—	—	—	—	—	—	—	981	39,581	—	3,070	—	85,700	7,099	173,500	—	595,200	61,400	966,531	183.06
Quincy . . .	—	—	—	—	—	—	—	—	—	—	15,450	—	32,123	—	76,120	72,328	206,248	994	433,125	78,188	914,576	173.22
Revere . . .	—	—	—	—	—	—	—	—	—	—	—	—	10,600	7,416	38,104	34,876	50,162	—	141,674	63,141	345,973	65.53
Somerville . . .	—	—	—	—	—	—	—	—	—	—	5,577	367	8,052	7,950	106,424	68,696	113,426	—	216,008	20,730	547,230	103.64
Stoneham . . .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10,725	175	5,110	—	121,356	19,887	157,253	29.78
Swampscott . . .	—	—	—	—	—	—	—	—	—	—	—	—	—	3,721	6,714	21,800	7,375	—	110,801	7,366	157,777	29.88
Watertown . . .	—	—	—	—	—	—	—	—	—	—	—	—	2,991	11,262	7,830	29,386	50,864	—	164,502	8,022	274,857	52.06
Winthrop . . .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4,049	24,198	49,366	—	57,703	43,539	178,855	33.87
Total feet . . .	81,337	17,569	13,133	236,130	25,790	22,968	7,274	107,687	149,212	193,983	280,571	367	480,644	88,690	2,318,761	1,063,576	2,264,434	994	5,004,742	669,748	13,027,610	—
Total miles . . .	15.40	3.33	2.49	44.72	4.88	4.35	1.38	20.39	28.26	36.74	53.14	.07	91.03	16.80	439.16	201.43	428.87	.19	947.87	126.85	—	2,467.35

TABLE NO. 22. — *Number of Service Pipes, Meters, Per Cent of Services Metered, Fire Services and Fire Hydrants in the Several Cities and Towns in the Metropolitan Water District December 31, 1927*

CITY OR TOWN	Services	Meters	Per Cent of Services Metered	Services Used for Fire Purposes Only	Fire Hydrants
Arlington	5,837	5,837	100.00	29	714
Belmont	3,480	3,480	100.00	7	402
Boston	95,771	93,854	98.00	2,968	11,435
Chelsea	5,674	5,674	100.00	126	430
Everett	6,836	6,836	100.00	42	588
Lexington	2,169	2,169	100.00	13	329
Malden	9,235	9,177	99.37	75	686
Medford	9,407	9,407	100.00	25	907
Melrose	5,336	5,336	100.00	23	429
Milton	3,535	3,535	100.00	3	541
Nahant	860	854	99.30	2	122
Quincy	15,347	14,802	96.45	26	1,580
Revere	6,141	5,714	93.05	7	423
Somerville	14,008	13,857	98.92	98	1,336
Stoneham	2,125	2,125	100.00	3	160
Swampscott	2,488	2,488	100.00	9	262
Watertown	5,582	5,582	100.00	36	580
Winthrop	3,481	3,481	100.00	5	358
District Supplied	197,312	194,208	98.43	3,497	21,282
Brookline	7,244	7,244	100.00	25	870
Newton	13,556	13,556	100.00	65	1,355
Total District	218,112	215,008	98.58	3,587	23,507

TABLE No. 23. — Elevation of the Hydraulic Grade Line, in Feet, above Boston City Base for Each Month at Stations on Metropolitan Water Works during 1927

1927 MONTH	LOW SERVICE										SOUTHERN HIGH SERVICE							
	WATERTOWN WATER WORKS OFFICE, MAIN STREET		BELMONT WATER WORKS SHOP, WAVER- LEY STREET		BOSTON, ENGINE HOUSE, BULFINCH STREET		ALLSTON, ENGINE HOUSE, HARVARD STREET		SOMERVILLE PUBLIC LIBRARY, HIGHLAND AVENUE		MALDEN WATER WORKS SHOP, GREEN STREET		CHELSEA COURT HOUSE		BOSTON METROPOLI- TAN WATER WORKS, OFFICE 1 ASHBURTON PLACE		WATERTOWN WATER WORKS OFFICE, MAIN STREET	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
January .	-	171	185	135	148	164	174	164	165	151	165	151	160	139	246	217	272	237
February .	-	167	186	139	162	166	174	165	165	149	165	151	159	142	248	220	274	237
March .	-	169	187	146	162	164	174	164	167	151	163	151	160	142	246	220	277	235
April .	-	167	187	153	162	164	175	165	168	151	165	151	160	143	248	220	274	233
May .	-	169	183	153	162	164	175	164	167	153	160	151	160	144	245	215	272	214
June .	-	164	183	150	162	163	176	162	166	153	160	151	158	142	245	211	266	224
July .	194 ¹	167	183	150	160	163	177	164	167	153	165	156	158	139	248	215	- ¹	-
August .	191	167	185	144	157	163	177	165	- ²	- ²	165	153	158	142	248	215	-	-
September .	196	169	186	144	155	164	- ²	- ²	- ²	- ²	166	151	155	142	244	211	-	-
October .	196	171	186	144	155	164	174	162	- ²	- ²	166	156	160	142	248	211	-	-
November .	197	169	187	141	155	164	174	164	- ²	- ²	167	155	162	143	248	217	-	-
December .	197	167	186	139	150	163	175	165	165	153	167	156	162	142	248	217	-	-
Averages	195	168	185	145	158	164	187	164	166	152	165	153	159	142	247	216	273	230

¹ Changed from Southern High Service to Low Service.

² Gage out of order.

TABLE No. 23. — *Elevation of the Hydraulic Grade Line, in Feet, above Boston City Base, etc. — Concluded*

1927 MONTH	SOUTHERN HIGH SERVICE — Concluded				NORTHERN HIGH SERVICE								NORTHERN EXTRA HIGH SERVICE			
	FORBES HILL TOWER, QUINCY		QUINCY WATER WORKS SHOP		SOMERVILLE WATER WORKS SHOP		MALDEN CITY HALL		REVERE WATER WORKS SHOP, BROADWAY		LYNN ENGINE HOUSE, UNION SQUARE		WINTHROP TOWN HALL, HERMAN STREET		Minimum	Maximum
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Maximum	Minimum	Maximum	Maximum	Minimum	Maximum	Minimum		
January	240	223	239	209	268	256	262	265	248	261	224	201	173	432	411	
February	240	223	237	209	268	252	262	267	247	263	236	194	171	438	411	
March	241	223	238	205	268	256	262	265	247	261	229	196	173	430	407	
April	241	222	238	207	268	256	265	265	244	261	222	199	173	430	384	
May	241	207	239	200	268	256	260	265	230	259	218	196	175	430	379	
June	241	207	239	192	268	247	258	265	232	253	194	199	166	425	337	
July	240	216	239	192	266	254	260	258	232	247	192	199	168	425	386	
August	240	219	239	198	266	252	258	259	228	250	208	196	171	438	393	
September	238	219	237	198	266	249	260	260	239	250	208	199	173	418	378	
October	238	216	238	204	266	252	260	265	235	257	215	199	176	426	367	
November	240	220	237	200	268	254	260	267	251	259	231	196	175	418	393	
December	239	219	237	205	268	254	260	267	247	257	231	199	176	423	381	
Averages	240	218	238	202	267	253	261	264	240	257	217	198	173	428	386	

APPENDIX No. 4

CONTRACTS MADE AND PENDING DURING
Contracts relating to the

	1 Number of Contract	2 WORK	3 Number of Bids	AMOUNT OF BID		6 Contractor
				4 Next to Lowest	5 Lowest	
1	23 ¹	Section 80, Mill Brook Valley Sewer, North Metropolitan System, in Arlington.	5	\$32,915 00	\$29,575 00 ²	Antony Cefalo, West Roxbury.
2	24 ¹	Section 81, Belmont Relief Sewer, North Metropolitan System, in Cambridge and Belmont.	11	63,537 00	63,491 50 ²	J. H. Ferguson Co., Providence, R. I.
3	25 ¹	Furnishing and placing two horizontal boilers at the Charlestown Pumping Station.	4	2,248 00	2,215 00 ²	International Engineering Works, Inc., Framingham, Mass.
4	26 ¹	Furnishing and setting two horizontal boilers at the Deer Island Pumping Station.	4	8,326 00	8,075 00 ²	D. W. Dillon Steam Boiler Works, Fitchburg, Mass.
5	27	Furnishing engine and centrifugal pump for Alewife Brook Pumping Station.	1	No bid	4,090 00 ²	Starkweather & Broadhurst, Inc., Boston, Mass.
6	28	Furnishing and installing a new economizer at the Charlestown Pumping Station.	2	2,303 00	2,100 00	The Green Fuel Economizer Co., Boston, Mass.

¹ Contract completed.

APPENDIX No. 4

THE YEAR 1927 — SEWERAGE DIVISION
North Metropolitan System

7	8	9	10	
Date of Contract	Date of Completion of Work	Prices of Principal Items of Contracts made in 1927	Value of Work done Dec. 31, 1927	
Aug. 23, 1926	April 13, 1927	— — —	\$29,249 23	1
Dec. 30, 1926	Oct. 6, 1927	— — —	68,416 93	2
April 28, 1927	June 9, 1927	For furnishing all material and constructing and erecting, ready for connection, two 60-inch horizontal tubular boilers.	2,215 00	3
May 12, 1927	Sept. 15, 1927	For removing two existing 60-inch horizontal tubular boilers and setting, and furnishing all material and constructing and erecting, ready for connection, including brick setting with all appurtenances, cast-iron fronts, water columns and grates, two 72-inch horizontal tubular boilers.	8,075 00	4
May 5, 1927	—	For constructing and furnishing f.o.b. West Medford, Mass., complete for erection a pumping unit consisting of an engine and centrifugal pump.	3,067 50	5
Sept. 13, 1927	—	For furnishing and erecting a 96 tube, 16 section, Green Fuel Economizer on foundations now in place.	1,050 00	6

² Contract based upon this bid.

CONTRACTS MADE AND PENDING DURING THE YEAR 1927 — SEWERAGE DIVISION
— *Concluded*

Summary of Contracts

	Value of Work done Dec. 31, 1927
North Metropolitan System, 6 Contracts	\$112,073 66

m

2

B.H. 554.52 FEB 27 1929
(contin)
Stack April 1932

